

Teaching the change agents of tomorrow



Mapping the current status of education in Sustainable Development Master's Programmes

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EXECUTIVE SUMMARY

The urgency of present day sustainability issues calls for a joint effort towards a more sustainable organization of political, economic and social systems. Traditional efforts by universities to produce sustainability professionals, capable of accelerating change towards a sustainable future, are regarded to be unsatisfactory. A new mode of knowledge production, transdisciplinarity, has therefore been proposed. Shifting an educational culture is difficult, however, and could create a gap between good intentions and actual implementation, leading to a blind spot about which educational visions currently dominate. To fill this, and other knowledge gaps on the way sustainable development is taught worldwide, a global survey among sustainable development students and lecturers was carried out, using online questionnaires. The survey was filled in by 287 students 54 and lecturers from 34 universities in 6 continents. The main focus of the study was to identify and explain the current balance of educational visions, sustainable development competencies and attention to sustainability issues in sustainable development master's programmes worldwide.

EDUCATIONAL VISIONS - Based on the survey findings one could (cautiously) conclude that higher sustainability education is well underway in fulfilling the requests to become more transdisciplinary and value driven. The high representation of interdisciplinarity and transdisciplinarity that was found in the participating programmes together the high representation of competencies like systems-thinking competence suggests that in many programmes the conditions are met for producing *generalists* sustainability professionals, which are promoted in literature.

The call for Mode 2 sustainable development teaching appears to be widely shared by the lecturers and students that participated in the survey. Students prefer their sustainability programme to be highly interdisciplinary and transdisciplinary with a share personal value development and subdisciplinarity. Lecturers appear to move further away from the empirical vision as main element of education and indicate that programmes should (aside from being interdisciplinarity and transdisciplinarity), focus more on personal value development and less on purely empirical knowledge production.

COMPETENCIES - Eleven competencies, important for future sustainability professionals (to be able accelerate change towards a sustainable future) were identified from literature and brought together in the KIB framework (Know, Interact, Be). The 'Know' cluster of competencies appears to be the best represented cluster in the programmes. The Interact cluster received mixed scores. The low level competence of the 'Be' cluster, is widely represented, the higher level are not. Reviewing the KIB framework, students appear to consider all competencies of the framework important for their later career as a change agent. The competencies considered most important for sustainability professionals are K3 Systems thinking and analytical-integrating capacity, K2 Professional knowledge, I4 Leadership and social skills, I3 Strategic competence and practical skills and I1 Communicative skills.

SUSTAINABILITY ISSUES – Energy and climate change is being taught about a lot in all programme groups. Population growth is the least taught sustainability issue on average. Ecosystems and biodiversity loss and inefficient production and consumption are both reasonably represented in all programmes. Poverty and food security is given significantly less attention in the programmes in Europe and Japan and Oceania compared to the programmes in North America and the developing countries. The only programmes in which Urban sprawl and unhealthy megacities is a main theme are Stellenbosch and TERI. It was found that in which world region a programme is situated cannot explain which the sustainability issues that are being taught in that programmes

This mix of factors that are the most influential on the way sustainable development is taught include little influences from outside the university. The students' job perspectives and demands from the labor market are considered only to play only a small role in which competencies sustainable development students are being taught. The lack of interest in the job market by master's programme directors may relates to the fact that the programmes intend to educate graduates that are most suitable to tackle sustainability issues, not graduates that fit best with the current available job descriptions.

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Maurice Tijm

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1 INTRODUCTION

1.1 PROBLEM DESCRIPTION

THE STATE OF THE WORLD

Reports from renowned scientific communities like the Millennium Ecosystem Assessment (Reid et al., 2005), the Fourth Assessment Report by the International Panel on Climate Change (IPCC, 2007) and the 2009 Human Development Report (UNDP, 2009) simultaneously express a strong message about the state of the planet and the living conditions of the poor. Human societies are coping worldwide with huge sustainability issues like unprecedented population growth, resource depletion, global warming and loss of biodiversity (Kates et al., 2001).

A NEW ROLE FOR HIGHER EDUCATION

The subject of this thesis is the education in sustainable development master's programmes. A main goal of these programmes is to help students in becoming future 'problem solvers' or 'change agents' (Blewitt and Cullingford, 2004) by teaching them the right skills, knowledge and attitudes. The impact of these worldwide efforts to prepare students in making a change, is, unsurprisingly, not reflected in any measureable progress towards sustainability (Jucker, 2002). The influence of higher education in sustainable development on the progress towards sustainability should not be overestimated (Jucker, 2002; Jones et al., 2010). Education cannot do the job of politics and if political, economic and social systems do not make a change into more sustainable structures, a transition towards sustainability is not to be expected.

That being said, many other publications (Blewitt and Cullingford, 2004; Martin and Jucker, 2005; Orr, 1994; Jones et al., 2010; Jerneck et al. 2011; Spangenberg 2011; Wiek et al., 2011, among others) stress that higher education in sustainable development is vital in the transition towards sustainability. Moreover, they claim that the field is not using its full potential. Universities should realize their potentially influential position and should start to act more prominently according to this: *"higher education is no longer in the privileged position of simply observing, criticizing, and evaluating what goes beyond the seminar room or campus"* (Blewitt and Cullingford, 2004;p.18). Conventional modes of sustainable development education and the mainstream trend in higher education towards specialization are considered not to provide the right skills and knowledge to produce graduates capable of accelerating change towards a sustainable future (Khan, 2002, Polk and Knutsson, 2008; Gibbons et al. 2004; Klein, 1996; among others). Rather than focusing on the transfer of knowledge, higher education in sustainable development should focus on enhancing the capacity of individuals and organizations to make change and transformation possible (Reuname and Pipere, 2011; Landorf et al., 2008). Also, in order to 'produce' graduates who are capable of accelerating change towards a sustainable future, higher education institutions should, in direct opposition to the mainstream trend towards specialization, produce generalists which are able to look at sustainability issues from a range of disciplinary angles, cultural perspectives and spatial perspectives and different time spans (Norbert-Hodge, 2000;p.189). A similar message can be found in the report by International Commission on Education for Sustainable Development Practice published in 2008 stating: *"Professionals working in the field of sustainable development, whether in intergovernmental organizations, developing-country ministries, developed-country aid agencies, non-governmental organizations or academic institutions—are not sufficiently prepared to surmount the challenges that they confront"* (Shaw and Kim, 2008;p. VI). Fortunately, efforts to make higher education more influential in accelerating change towards a sustainable future are made like the initiatives and debates around the concept of 'Education for Sustainable Development' (ESD) and the proclamation the period 2005-2014 as the Decade for Education for Sustainable Development (DESD, see paragraph 3.1).

A NEW MODE OF EDUCATION

Instead of the regular scientific approach of focusing on the disciplinary aspects of a problem in isolation, using an 'objective' analytical perspective, a *transdisciplinary* approach to learning on sustainability issues is widely advocated for having a higher potential in learning students skills and knowledge that would enable them after graduation to play a more influential role in the process towards sustainability (Lang et al., 2012; Kates et al., 2001; Alvares and Rogers, 2007; Allen-Gil et al., 2005; Scholz et al., 2006). In transdisciplinary education collaborations of students from different disciplines and non-academic stakeholders should together develop solution options to real life sustainability issues (Lang et al., 2012; Brundiens and Wiek, 2011). The transdisciplinarity approach to sustainable development education is often referred to as 'Mode 2' knowledge production (Brundiens and Wiek, 2011).

Summarizing the issue at stake, the urgency of present day sustainability issues calls for a joint effort towards a more sustainable organization of political, economic and social systems. Traditional efforts by universities to produce sustainability professionals capable of accelerating change towards a sustainable future are regarded to be unsatisfactory. A new mode of knowledge production has therefore been proposed. Many universities have followed up this advice and added transdisciplinary case study projects to their sustainable development master's programmes curriculums (Alvarez and Rogers, 2007; Gil et al., 2005; Bootsma et al., in press; Lang et al., 2012, Scholz et al., 2006; Stauffacher et al., 2006).

STATUS OF SUSTAINABLE DEVELOPMENT MASTER'S PROGRAMMES UNCLEAR

A change of educational culture towards transdisciplinary knowledge production, however, requires an institution to go through a deep learning process and ask a lot of programme directors and teaching staff (Sterling, 2004, p. 58), possibly for this reason, there appears to be a gap between good intentions and actual implementation, making it unclear what modes of sustainable development education currently dominate in sustainable development master's programmes (Rowe, 2007;p.324). An often read recommendation in the UN related documents on Education for Sustainable Development (See Paragraph 3.1.1) was the advice to universities to cooperate. The first step in this process is '*to know what the others are doing*'. This is exactly what was lacking in the literature that can be found on higher education in sustainable development: **An overview what is taught about sustainable development and how sustainable development is being taught in the numerous interdisciplinary sustainable development master's programmes that exist worldwide.** Moreover, the theories developed on higher sustainable development education teaching methods, including the transdisciplinary case study method, are to a large extent based on personal experiences of the authors at the universities where these authors are active¹. These theories do not necessarily hold for other sustainable development master's programmes. It would be highly relevant to produce an overview of *what is taught* about sustainable development and *how sustainable development is being taught* worldwide and, furthermore, *what* and *how* sustainable development *should* be taught according to both the future sustainability professionals (the students) and the lecturers. This would create a contemporary overview of the current status of teaching in sustainable development master's programmes worldwide as well as an contemporary overview of how these programmes *should* look like according to their students and lecturers to help students in becoming future change agents.

¹ Examples are among others: Alvarez and Rogers, 2007, Bootsma et al. in press, Brundiens and Wiek, 2011; Giacomelli et al., 2003, Scholz et al., 2006; Posch and Steiner, 2006.

RESEARCH QUESTION

Keen to contribute to the knowledge production on the best teaching approaches to produce well equipped academic sustainability professionals, this study makes a first attempt to map *what is taught* about sustainable development, *how* sustainable development *is being taught*, and how sustainable development *should be taught*, in higher sustainable development education. The following research question was used for this study:

In what way is sustainable development being taught in sustainable development master's programmes, how does this relate to the competencies² sustainable development students should develop (to become future change agents) and by which factors could this relation be explained?

The first half sentence, 'in what way sustainable development is being taught', refers to: (1) on which sustainability issues the focus is laid, (2) which competencies are being taught and (3) which educational vision dominates in the programme (see Section 3).

The second part of the question '*how does this relate to the competencies sustainable development students should develop (to become future change agents)*' relates to what the literature, sustainable development lecturers and students say about what future change agents should learn during their studies.

For the final part of the question '*by which factors could this relation be explained*' was looked into the possible factors that explain the way sustainable development was found to be taught.

² Types of knowledge, skills and attitudes students should develop in their studies is commonly referred to as 'competencies' (Bartman et al., 2007). Competencies include both specific and general knowledge, skills and attitudes that students obtain in their studies and generally refer to explicit expectations of what a student will be able to do as a result of a learning activity (Jenkins and Unwin, 1996).

1.2 SUB QUESTIONS

A number of sub questions provided guidance during the study. The four following sub questions, relating to theory, were studied:

1. *What is higher education in sustainable development?*
2. *Which competencies should sustainable development students develop to play a role in accelerating the transition towards sustainable development?*
3. *Which educational visions are recognized on teaching sustainable development in higher sustainable development education?*
4. *Which practical factors and factors regarding content influence the way sustainable development is taught in sustainable development master's programmes?*

How and what is being taught about sustainable development in sustainable development master's programmes was analyzed by using the following sub questions:

1. *Which educational visions³ dominate (and should ideally dominate) in the sustainable development master's programmes?*
2. *Which competencies are being taught (and should ideally be taught) in the sustainable development master's programmes?*
3. *Which sustainability issues are being taught (and should ideally be taught) in the sustainable development master's programmes?*

³ A number of pedagogical visions like, 'disciplinarity' and 'transdisciplinarity' dominate the discussions on what type of education fits best with the kind of knowledge, skills and attitudes students should learn in their master's programme (see Paragraph 3.2).

1.3 RESEARCH OBJECTIVE

The aim of this study is to contribute to:

1. Knowledge production on what sustainable development students should (and would like to) learn to be able to play a role after graduation in the transition towards sustainability.
2. Knowledge production on what are considered the right educational visions to produce well equipped graduates that are able to play a role in the transition towards sustainability.
3. Knowledge production on the current state of higher sustainable development education by investigating the extent to which the findings on the two subjects above are found back (1) in the views of sustainable development master students and lecturers on these subjects and (2) the way sustainable development is educated in multidisciplinary sustainable development master's programmes in different continents.

This study produces *descriptive knowledge* in the form of an overview of (1) what competencies are considered important for sustainable development graduates, (2) what are considered the best educational visions to produce well equipped sustainable development graduates and (3) the current state of sustainable development education at master level.

Explanatory knowledge is gained from a number of explanatory variables that were included in the questionnaires focusing on what could explain the variety in the way sustainable development is being taught in different sustainable development master's programmes.

1.4 OVERVIEW OF THE THESIS

In Section 2 (p.6) the research methodology is described. Section 3 (p.10) is the theoretical backbone of this study. The study's results are summarized and discussed in Section 4 (p.27). This is followed by the conclusion and discussion in Section 5 (p.62).

2 METHODOLOGY

Desk research and a survey are the two research methods in this study. The outcome of the desk research is used to develop the survey.

2.1 DESK RESEARCH

Survey research requires relatively much knowledge about the subject beforehand since compiling an efficient questionnaire requires a great deal of prior knowledge of the theory around the research topic (Verschuren and Doorewaard, 2010). For the literature study on the concept sustainable development, the discourses around teaching sustainable development and the required competencies for sustainable development graduates, comprehensive queries were undertaken in the well known scientific databases to be sure the framework included the most important academic views.

Queries were undertaken in Scopus, Omega and Google Scholar using the following search terms: *ESD*, *Education for sustainable development*, *HESD*, *Higher education ánd sustainability*, *sustainability education*, *knowledge production*, *competence*, and more. This was supplemented by a full query in the following journals using the search terms '*Sustainable*' and '*Sustainable development*' in journals focusing on education and on the contrary, '*Education*' in journals on sustainable development. The following journals were studied: *International journal of sustainability in higher education*; *Environment: science and policy for sustainable development*; *Journal of education for sustainable development*; *Journal of sustainable development*; *Sustainable Development*; *Journal of higher education*; *Higher education quarterly*; *Higher education perspectives*; *Higher education research and development*. Moreover, the reference lists of the articles that were found were scanned to look for supplementary titles.

The desk research provided the basis of the theory that can be found in Section 3.

2.2 SURVEY

The desk research provided the basis for the theoretical framework in Section 3, on which in turn the survey was based. With a survey it is possible to gather data from a large number of research units, i.e. the experiences and opinions of many students and lecturers could be asked. A study should contain at least 30 research units to avoid gathering of less reliable or less precise results (Vocht, 2007). This number was reached by the total number of students (287) and lecturers (54) that filled in the questionnaire. With use of the right statistical tests and cautious analysis it is possible to get valuable results with these numbers of respondents.

Using an online questionnaire survey for gathering data for this research has several advantages. In the survey is asked for *view* of students and lecturers on the representation of the three educational elements (educational visions, competencies, taught sustainability issues). There is, of course a difference between the perceived representation and the actual representation of these elements. Asking the students and the lecturers about their programme, however, provides far more detail of the actual teaching than other methods that fitted the time span of the thesis like a web search on programme content. The second advantage is that questionnaires can be sent to a large number of people. As it is desired to get response from students and lecturers from different world regions, distribution online is an excellent method to reach respondents from all parts of the world. Moreover, for a high amount of respondents, it is relatively quick to collect data with an online questionnaire survey (Tlupova 2008; Bartelds et al. 1989). As a master-thesis research project lasts only 6 months it was essential that data gathering was relatively quick, so this was a relevant feature. The questionnaires are filled in by the respondents in their own time and their own convenience. This will give the respondents the time to think about their given answers, furthermore, anonymity is guaranteed for the respondents by using a questionnaire survey (Tlupova 2008; Bartelds et al. 1989). The online survey client and the premade answer possibilities will give answers that are easy to analyse with statistical software.

One, however, should also bear in mind the different limitations of using an (online) questionnaire survey. First, the respondents could miss nuances in the answers they give, as they are premade by the researchers (Bartels et al. 1989). In this research it was tried to avoid this by giving the respondents the possibility to fill in their own answer if desired, by giving them an 'other: ...'-option. Another shortcoming of this method is that not all respondents will fill in the questionnaire. This leads to the possible issue that a master's programme might be described only on the basis of the views of a few first year students. To avoid this problem of low representation, the programmes were categorized in geographical groups (Read more about this exercise in the introduction of Section 4 Results (p.27). To achieve a high as possible respondent rate for this research the respondents were sent reminders. However, it could not be avoided that differences were found in the response levels between the different participating universities. The programmes with low response are therefore not analysed individually.

2.2.1 SELECTION OF SUSTAINABLE DEVELOPMENT MASTER'S PROGRAMMES

For the survey, a large range of master's programmes were invited. The following procedure was used to selecting and arrange a sufficient number of sustainable development master's programmes as objects of research. For this study only master's programmes were included that are actually addressing sustainable development as a comprehensive program, with an interdisciplinary approach having inputs from both natural and social sciences. The numerous more focused programmes, like 'sustainable energy', 'sustainable water management', 'sustainable engineering', 'sustainable agriculture', as well as the programmes focusing on environment 'only' were excluded for reasons of focus.

Programme leaders of 11 sustainable development master's programmes that had visited a new "Alliance" for teaching sustainable development meeting that was founded in Bellagio, were contacted. Additionally, Utrecht University's partner institutions of the Joint Degree programme in Sustainable Development, an international 2 year joint sustainable development master's programme possible at 5 European Universities, were contacted. The list of participants extended substantially when the 22 programmes of the Global Master's in Development Practice network agreed upon the distribution of the survey among their students and lecturers.

This relatively young network of multidisciplinary master's programmes is the outcome of efforts from the International Commission on Education for Sustainable Development Practice, funded by the Mac Arthur Foundation and based at Colombia University's Earth Institute. The in 2007 established commission's task was to identify "*the core cross-disciplinary educational needs*" to support problem solving for sustainable development (Shaw and Kim, 2008;p.VI). This task was based on the experience that professionals working in the field of sustainable development were not sufficiently prepared to surmount the challenges that they were confronted with. In addition to these 30+ programmes, a number of sustainable development programmes in Oceania were contacted to complete the global representation of sustainable development master's programmes into at least two programmes on each continent.

The final result of these efforts was the list of participating Sustainable development master's programmes in Table 2-1.

Table 2-1: Participating master's programmes

LIST OF PARTICIPATING PROGRAMMES			
NR	Name of Programme	Name of University	Number of students enrolled in programme 2011-2012
NORTH AMERICA			
1	Master of Public Administration in Development Practice (MPA-DP)	Colombia University, New York, US	45
2	Master's in Development Practice (MDP)	Arizona State University, Phoenix, US	113
3	Master's of Science in Development Practice (MDP)	Emory University, Atlanta, US	16
4	Master of Sustainable Development Practice (MDP)	University of Florida, Gainesville, US	8
5	Master's in Development Practice (MDP)	University of Minnesota, Minneapolis, US	18
6	Master's in Development Practice in Indigenous Development (MDP)	University of Winnipeg, Canada	17
LATIN AMERICA			
7	Master's of Science in Development Practice (MDP)	CATIE, Costa Rica	32
8	Master's of Science in Sustainable Development Practice	Universidade Federal Rural do Rio de Janeiro, Brasil	20
EUROPE			
9	Master's Programme in Sustainable Development	Utrecht University, the Netherlands	200
10	International Joint Master's Programme in Sustainable Development	University of Leipzig, Germany	16
11	MSc Environmental Change and Management	Oxford University, UK	38
12	Masters in Development Practice (MDP)	TCD and UCD, Dublin, Ireland	27
13	Joint Master's Degree in Sustainable Development	Karl-Franzens-Universität Graz, Austria	300
14	Joint Master's Degree in Sustainable Development	Ca' Foscari University of Venice, Italy	D.D.
AFRICA			
15	Master's Programme in Sustainable Development	Stellenbosch University, South Africa	106
16	Master's in Development Practice (MDP)	Université Cheikh Anta Diop (UCAD), Senegal	23
17	Master's in Development Practice (MDP)	University of Botswana, Botswana	12
18	Master of Development Practice (MDP)	University of Ibadan, Nigeria	9
ASIA			
19	Graduate Programme in Sustainability Science (GPSS)	University of Tokyo, Japan	22
20	Global Environmental Leaders Education Program for Designing a Low-Carbon World	Hiroshima University, Japan	47
21	Environmental Management	Peking University, China	24
22	Master's in Sustainable Development Practice	Teri University, India	48
23	Masters in Development Management and Practice (MDMP)	BRAC Development Institute, Bangladesh	11
24	Master in Development Practice (MDP)	University of Peradeniya, Sri Lanka	28
25	Master of Public Administration in International Development (MID)	Thsinghua University, China	38
OCEANIA			
26	Master of Sustainable Development	Macquarie University, Sydney, Australia	D.D.

2.2.2 DESIGN OF QUESTIONS (CRAFTING THE ONLINE QUESTIONNAIRE)

To make the data collection more structured and easier to handle, closed questions were used in the questionnaires. The questions had to be clear, simple, neutral and where designed to address only one subject at a time (Baarda and De Goede, 2006). The questionnaire included different types of multiple-choice questions, based on the type of data the question had to produce and the possibilities of the question editor of 2ask.net (the survey client that was used). As told, all the questions are related to the theoretical framework made in section 3. The lecturer questionnaire is found in Appendix C, the students questionnaire is found in Appendix D.

2.2.3 DISTRIBUTION OF QUESTIONNAIRE

The questionnaire came online at the end of May 2012, two invitations letters (one for students and one for lecturers) including a direct link to the online questionnaire, were sent out to the programme coordinators of the sustainable development master's programmes. The coordinators distributed the questionnaires further to the students and lecturers of their master's programme. The initial idea was to ask the programme coordinators after ten days and twenty days to send out a reminder. In practice, some anticipation was needed because a delay appeared between the contacting of the coordinators and the actual distribution of the questionnaires among the students and lecturers of the programmes. Various factors resulted in a slower student response, like the fact that students were abroad on field trips, or the questionnaires needed approval. For these reasons, the survey period was extended and closed not earlier than the last week of July 2012.

2.3 METHODS OF DATA ANALYSIS

The analysis of the survey results was done using SPSS (Statistical Package for the Social Sciences), a software package for statistical analysis which needs no introduction. For describing the frequencies and providing a first overview of the survey results, descriptive statistics were used. For generating the graphs 'Crosstabs' was used to organize the categorical variables (like the Likert scales 'Unimportant – Very Important or 'Disagree – Agree') which were further processed in excel to be able to present them together in one graph. To test significant differences Student's T-Test was used for interval variables and Mann-Whitney U tests for the categorical variables. More details on this procedure can be found in the Introduction of Section 4 Results (p.27). For both tests 0.05 was used as the standard level of significance.

3 THEORETICAL BACKGROUND

In this Section the four theoretical sub questions are answered:

1. **Paragraph 3.1 (p.10):** *What is higher education in sustainable development?*
2. **Paragraph 3.2 (p.11):** *Which educational visions are recognized on teaching sustainable development in higher sustainable development education?*
3. **Paragraph 3.3 (p.16)** *Which competencies should sustainable development students develop to play a role in accelerating the transition towards sustainable development?*
4. **Paragraph 3.4 (p.21)** *Which practical factors and factors regarding content influence the way sustainable development is taught in sustainable development master's programmes?*

The section forms the basis for the different elements in the student and lecturer survey: In each paragraph a schematic representation or table shows which views were included in the questionnaire content. By asking the respondents about their view and experiences in the various subjects, the theory could be checked with the contemporary views for the students (the future change agents) and the lecturers.

3.1 HIGHER EDUCATION IN SUSTAINABLE DEVELOPMENT

Referring back to the introduction, contemporary sustainability issues are in need for sustainability professionals that possess the right set of competencies to deal with the complexity of these issues. Higher education sustainable development programmes play an important role in the teaching advanced skills and knowledge to future sustainability professionals (Unesco, 2003; Calder and Clugston, 2005).

3.1.1 A BRIEF HISTORY OF SUSTAINABLE DEVELOPMENT EDUCATION

A websearch by Keere of sustainable development master's programmes indicates that there are currently more than 50 multidisciplinary sustainable development master's programmes worldwide (Keere, 2012). This has not always been the case. In this subparagraph a number of influential events on the development of higher education programmes on sustainable development are described. This subparagraph provides a necessary context for the remainder of the study but should not be judged as an all inclusive overview of the rise of higher sustainable development education.

In the history of environmental education, and what later became education in sustainable development, a link can be identified between the changing concerns about the environment and its associated problems and the way in which environmental education developed (Tilbury, 1995). This was already the case in the early seventies when environmental education emerged as a product of the, by that time, unprecedented concern about the environment and the future of the planet. This concern was raised by a number of well known but alarming publications on the state of the environment like Carlson's *Silent Spring* (Carlson, 1962) and Meadows et al. their *Limits to growth* (Meadows et al., 1971). In that period of time environmental education was not accepted as a concept in its own right, but instead was dispersed in a diversity of disciplines (Tilbury, 1993). In the decades that followed the nature and scope of environmental education became wider and moved to an interdisciplinary and global approach (Tilbury, 1993). The concept of 'sustainable development' became part of the vocabulary of environmental education not earlier than the 1990s (Tilbury, 1995). The large scale embracement of the concept of sustainable development was preceded by the UN Rio de Janeiro Earth Summit where 180 governments had committed themselves to the quest for sustainable development. The Rio Summit was in turn built on the well known United Nations 1987 Brundtland Report in which sustainable development was defined as *"development which meets the needs of the present without compromising the ability of future generations to meet their own needs"* (WCED, 1987).

The Rio Summit, through Agenda 21, identified a wide range of strategies for achieving sustainability, in which education was identified as one of the most important tools for sustainable development (Corridi, 2008). Education was seen as a means of raising environmental awareness, not only across the public at large but, in time, also among key decision-makers in governments and businesses (Chalkley, 2002). The progress made by the Agenda 21 initiatives in the years that followed, however, was considered inadequate, and the concept of 'Education for Sustainable Development' (ESD) was introduced after an international debate on how to reshape sustainable development education. ESD could be described briefly as *"the process of learning how to make decisions that consider the long-term future of the economy, ecology and equity of all communities"*⁴ (Calder and Clugston, 2005;p.34). An extra effort was made to promote sustainable development education by proclaiming the period 2005-2014 as the Decade for Education for Sustainable Development (DESD) (Calder and Clugston, 2005).

The focus of this thesis is on *higher* education in sustainable development. While ESD is about all types of education, the Decade for ESD did set the stage for sustainable development education to move forward in higher education as the decade brought sustainable development education leaders and stakeholders together to determine the resources, research priorities and strategies that were needed for making sustainable development a major priority of higher education (Calder and Clugston, 2005;p.12). This resulted in a prominent role for higher education in the Decade for ESD. The DESD report states: *"Universities must function as places of research and learning for sustainable development. Higher education should emphasize experiential, inquiry-based, problem-solving, interdisciplinary systems approaches and critical thinking. Curricula need to be developed, including content, materials and tools such as case studies and identification of best practices"* (Unesco, 2004;pp. 22-23).

There are different ways for sustainable development to be incorporated into higher education: one is to incorporate sustainable development in all programmes at a university; to ensure that graduates with all kinds of degrees are all sustainable development-literate. Another way is campus environmental management (Shriberg, 2002). The final option is to produce sustainable development specialists in sustainable development programmes (Sherren, 2007). The focus of this thesis is on the latter: teaching sustainability professionals in sustainable development master's programmes.

3.2 VISIONS ON HIGHER SUSTAINABLE DEVELOPMENT EDUCATION AND RESEARCH

In this subparagraph is dealt with the different 'pedagogical visions' on teaching in higher education programmes and sustainable development programmes in particular. The body of text is finalised at the end of the Section with a summarizing table that is used in the questions around the topic in the student and lecturer survey of which the results are described in sections 4. While reading the different educational visions in this paragraph, one should keep in mind that the teaching in a sustainability master's programme always consist of mix of the educational visions; different visions are suitable for teaching different sets of competencies.

Sustainable development master's programmes are based on a certain vision on the way the sustainable development has to be taught in a sustainable development master's programme. Usually this vision is generated by the programme leaders of a sustainable development master's programme together with associated teaching staff, the university's board and other university members. A number of pedagogical visions like, 'disciplinarity' and 'transdisciplinarity' dominate the discussions on what type of education fits best

4 .The full definition of ESD, according to UNESCO education, is the following: Education for Sustainable Development is interdisciplinary and holistic, explicitly value driven with the values examined, debated, tested and applied. Built around critical-thinking and problem-solving and so confidence building in the face of the dilemmas and challenges of sustainable development: multi-method and participatory, applying different pedagogies and fostering cooperative learning and decision-making between teachers and learners, and locally relevant and grounded in local languages and cultures (Unesco, 2004, p16)

with the kind of knowledge, skills and attitudes students should learn in their master's programme. These pedagogical visions are also called 'pedagogical concepts,' 'discourses', 'educational concepts' or 'types of knowledge production' (Hessels and Lente 2008; Lang et al., 2006), for this study it was decided upon to use the term 'educational vision' consistently. The same educational visions that are described in this paragraph can be found back in the similar discussions on the way that research should be done (Stauffacher et al., 2006). This is unsurprising because education and research are both a form of knowledge production and both forms struggle with the same questions: how to study complex issues like climate change or globalization.

3.2.1 DISCIPLINARITY

Higher education and academic research are traditionally divided in different 'disciplines' (Kreber, 2009). What such disciplines actually are is difficult to point at as defining the concept of 'disciplines' is recognized as difficult (Becher and Trowler, 2001;p.41). The subjects being taught at university often represent the various disciplines but not every subject being taught at university can be called a discipline (Krishnan, 2009;p.3) The following list of characteristics by Krishnan describes best what can be called an 'academic discipline': *Disciplines.. (1) have a particular object of research; (2) have a body of accumulated specialist knowledge not shared with another discipline; (3) have theories and concepts to organize the accumulated specialist knowledge; (4) have specific terminologies; (5) have developed specific research methods 6) have some institutional manifestation in the form of subjects taught at universities or colleges, academic departments and professional associations (Krishnan, 2009;p.3).*

Disciplinary research or education takes place within the boundaries of a single academic discipline (Figure 3-1) and focuses on disciplinary aspects of a problem in isolation, using an 'objective' analytical perspective (Winter, 2003; Bootsma et al., in press). This prevailing design of education and knowledge into disciplines finds its roots in rationalism, in which knowledge is expected to be derived from an 'evidence-based', 'rigorous' and 'scientific' understanding of the world (Sipos et al., 2007). Science practiced in this way ideally leads to objectivity, certainty, universality and predictability (Phelan, 2004). Disciplinary research is therefore often associated with 'methodological rigour' and 'control for error', 'going deep into the subject' and 'exactness' (Van den Besselaar and Heimeriks, 2001). Disciplinarity is also referred to as 'Mode 1' knowledge production (Lang et al., 2012).

disciplinary

- Within one academic discipline
- Disciplinary goal setting
- No cooperation with other disciplines
- Development of new disciplinary knowledge and theory

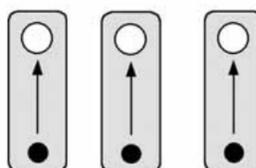


Figure 3-1: Disciplinarity (From: Tress et al., 2006)

3.2.2 INTERDISCIPLINARITY

While disciplinarity is still appreciated for certain characteristics, such as 'rigorous', 'objective' and 'digging deep', a lot of critique can be found on the vision. Opponents blame disciplinarity for being static, conservative, adverse to innovation (Van den Besselaar and Heimeriks, 2001) and splitting science knowledge into smaller and smaller, increasingly irrelevant pieces (Sipos et al., 2007).

New ways of doing research in which subjects are studied from different disciplines (instead of from a single discipline), started to emerge from the seventies onwards (Klein, 1990). These new forms of interactive research are known under a number of names of which interdisciplinary research and transdisciplinary research are the most widely known. The main differences between these concepts are the intensity of cooperation and integration of disciplines and the involvement of non-academic fields (Winder, 2003).

In interdisciplinary studies (Figure 3-2), involving several academic disciplines (*within* the social or natural sciences or from *both* the natural and social sciences), discipline related subject boundaries are crossed to create new shared (non-disciplinary) knowledge and theory and solve a common research goal (Winter, 2003; Tress et al., 2006). In such projects qualitative and quantitative approaches can both be used. The fact that subject boundaries are crossed to create new knowledge makes interdisciplinarity fundamentally different from multidisciplinary in which the subject boundaries are not crossed. Multidisciplinary is not included in this paragraph (and the questionnaires) because of the limited attention it is given nowadays both in research and higher education (Spanenberg, 2011). Interdisciplinarity became a buzzword in scientific debates and many research funding organizations have promoted it as the desirable direction towards which the social sciences should develop themselves (Spangenberg, 2011). Interdisciplinary research is also associated with creativity and progress, as several intellectual 'breakthroughs' were achieved by crossing disciplinary boundaries (Morrilo et al., 2003).

interdisciplinary

- Crosses disciplinary boundaries
- Common goal setting
- Integration of disciplines
- Development of integrated knowledge and theory

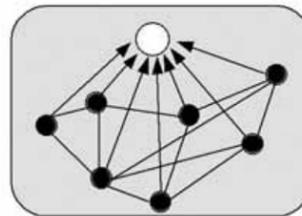


Figure 3-2: Interdisciplinarity (From: Tress. et al., 2006)

3.2.3 TRANSDISCIPLINARITY

Transdisciplinary research goes one step further than interdisciplinary research. In transdisciplinary knowledge production it are not only researchers from different disciplines participate but also non-academic actors to study a common goal and to create new knowledge and theory (Tress et al., 2006). Non-academic participants can be all kind of societal actors like policy makers, representatives of administration or interest groups, locals or the broader public (Lang et al., 2012).

It is this transdisciplinary problem-based research that integrates academic and non-academic knowledge that is referred to as Mode 2 knowledge production. Mode 2 is quite widely acclaimed and promoted as the way to go in sustainable development research and education (Kates et al., 2001; Brundiers and Wiek, 2011; Alvares and Rogers, 2007; Allen-Gil et al., 2005; Scholz et al., 2006). The arguments are the following: (1) The complexity of sustainability issues ask for different types of knowledge and different sources of knowledge (Cash et al., 2003), (2) Conventional ways of knowledge production perform unsatisfactory in dealing with the full complexity of environmental management (Ludwig et al., 2001), and moreover, (3) do not succeed sufficiently in integrating local stakeholder perspectives in the development of environmental management strategies (Olsson and Folke, 2001; Raymond et al., 2010). That being said, a good deal of criticism, summarized

by Hessels and van Lente (2008), has been raised against the transdisciplinary knowledge production-philosophy, including notes on supposed lack of reflexivity, quality control and disregard of the scientific practice that is already there.

transdisciplinary

- Crosses disciplinary and scientific/academic boundaries
- Common goal-setting
- Integration of disciplines and non-academic participants
- Development of integrated knowledge and theory among science and society

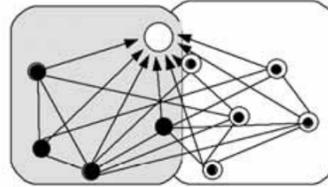


Figure 3-3: Transdisciplinarity (From: Tress et al., 2006)

3.2.4 PERSONAL VALUE DEVELOPMENT

In science a researcher traditionally tries to be as objective and value-free as possible during his study. The recognition of the limitations of relying solely on rationalism (briefly and partly described under disciplinarity), however, has resulted in pleas to re-acknowledge humanist values and an acknowledgment of human fallibility (Saul, 1997; Sipos et al., 2006). Supporters of this educational vision, labelled in this thesis as 'Personal value development', ask universities to take their responsibility, pointing that fact the threat to the planet is largely the result of work by people with BsCs, MsCs and PhDs (Orr, 1994;p.7). To quote Orr *"Instead of focusing on rationalism, it is time to ask what we need to know to live humanely, peacefully, and responsibly on the earth, and to set research priorities accordingly"* (Orr, 1992;p. xi). Sustainable development change agents should have a value system and self-perspective to support, weight and ground their actions as change agent (Svanström et al., 2008). Furthermore, sustainable development graduates need to know different value-laden concepts, not to position themselves in value laden debates but to facilitate dialogue (Orr, 2002).

3.2.5 SUMMARY AND LINK TO THIS STUDY

This section was set up to identify and clarify the different discourses that exist on teaching higher education. Debates on which discourse is most suitable for teaching different aspects of sustainable development are still unresolved. Sherren suggests that disciplinary and transdisciplinary research should coexist as *“you cannot generalize specialist scientific knowledge to develop structures for human behaviour and ethics, nor can you use big-picture knowledge of a system to solve problems without specific domain knowledge”* (Sherren, 2006, p. 402). Another statement by Sherren is that no perfect degree is desirable because each institution should build on its own strength (Sherren, 2005;p. 104).

Students and lecturers were asked on this subject in the survey to get an overview of how sustainable development is taught in different sustainable development master’s programmes. Another motive of including these visions in the survey was to check what impact of the strong calls for transdisciplinarity have had on the teaching practice in sustainable development master’s programmes.

The following table (Table 3-1) on educational visions was used in the student and lecture questionnaires.

Table 3-1: Educational visions as they were included in the student and lecturer questionnaires

Integrative perspective (Broad) Educating students in several disciplines, both natural and social science with a focus on cross disciplinary thinking and keeping a holistic view.
Sub discipline perspective (Deep) Education is focused on mastering a limited number of disciplines: Specialization into specific subfields.
‘Value-free’ Empirical perspective (Scientific) Focus on the practice of value free, independent scientific research.
Transdisciplinary perspective (Linking science to projects in society and the market). Focus on generating knowledge in collaboration with parties outside the universities including business, governmental agencies and civilians).
Personal value development perspective (Normative) Focus on understanding justice, equity, social-ecological integrity, and ethics and to personally develop and apply sustainability values and targets.

3.3 COMPETENCIES

One of the main components of the discussion between the different educational visions is that the trend in higher education towards further specialization together with traditional teaching styles does not produce the sufficient knowledge, skills and attitudes to produce graduates capable of accelerating change towards a sustainable future (Khan, 2002, Polk and Knutsson, 2008; Gibbons et al. 2004; Klein, 1996; among others). It is unclear what type of knowledge, skills and attitudes is exactly meant here. In this paragraph, therefore, a framework of ‘the most important types of knowledge, skills and attitudes sustainable development students should possess after graduation’ is created from both higher education literature and higher sustainable development education literature.

Types of knowledge, skills and attitudes students should develop in their studies is commonly referred to as ‘competencies’ (Baartman et al., 2007). Competencies include both specific and general knowledge, skills and attitudes that students obtain in their studies and generally refer to explicit expectations of what a student will be able to do as a result of a learning activity (Jenkins and Unwin, 1996). There also exists a pile of literature on ‘sustainable development competencies’, competencies that are particularly relevant for sustainable development students. Such sustainable development competencies are defined as *“types of knowledge, skills, and attitudes that enable successful task performance and problem solving with respect to real-world sustainability problems, challenges, and opportunities”* (Baartman et al., 2007; Dale and Newman, 2005).

The advantage of using competencies is that it enables to have an explicit and commonly shared framework to characterize education programs and graduates (Baartman et al. 2007; Wiek et al., 2011). For sustainable development programs such a framework could function as critical reference for the development of a knowledge and skill profile that students should possess in order to become a future transition manager working on sustainable development (Wiek et al., 2011; Rowe 2007).

3.3.1 COMPETENCIES FOR SUSTAINABILITY PROFESSIONALS: A FRAMEWORK

To identify the most important competencies for sustainable development students a competencies framework was first developed from lists of competencies in literature. This framework of competencies is compared later (Section 4) with the views of students and lecturers on what they consider are the most important competencies for sustainable development students.

A document from the Joint Quality Initiative called ‘the Dublin Descriptors’ forms the European standard for the competencies students should acquire in higher education programs. The Dublin descriptors are widely implemented, these competencies were therefore chosen to represent the set of competencies every academic student should learn. These general competencies were checked with the competencies listed in an often cited publication by the OECD (2005) of the DeSeCo, the ‘Definition and Selection of Competencies Project’ (OECD, 2005).

The list of competencies from the Dublin Descriptors was complemented with a list of competencies created by Wiek et al. (2011) specifically created for sustainable development students from literature on specific sustainable development competencies. Their framework is a first attempt to synthesize the literature on sustainable development competencies into an over-arching framework of sustainable development competencies. Given the scale of their project and the fact that the study was published only months before this master thesis project started, it was assumed that this article provided an up to date and thorough overview of the specific sustainable development competencies listed in scientific literature. In order to be inclusive, the competencies identified by Wiek et al. (2011) were checked on missing competencies with other articles that also list or discuss a variety of competencies for sustainable development graduates (Barth et al.,

2007; Brundiers et al., 2009; Kates et al., 2001; Svanstrom et al., 2008; Runhaar et al., 2005). No additional types of competences that could add a fundamentally different competence to the framework, were found in these articles. The '*' marks in Table 3-2 show the competencies that were found in these articles and already were part of the framework.

The final article that was used to complete the list of competencies was written by Bootsma and Vermeulen (2011). This publication deviates from the other articles in that it uses the views of alumni of a sustainable development master's programme to come to a list of competencies important for sustainable development students.

A total of 21 competencies were found in these articles. All competencies were sorted on overlapping subjects in a large table: competencies that largely overlapped ended up in the same row, unique competencies were assigned to an individual row. This sorting process resulted in a total of eleven unique competencies. A summary of the selecting exercise can be found in Table 3-2.

Table 3-2: Summary of the selection process of the competencies. The competencies that are marked with a ‘**’ were also found in Barth et al., 2007; Brundiens et al., 2009; Kates et al., 2001; Svanstro et al., 2008; Runhaar et al., 2005).

Described in:				Competences for sustainable development students
Wiek et al. (2011)	DeSeCo (OECD (2005))	Bootsma and Vermeulen (2011)	Dublin descriptors (Joint Quality Initiative (2004))	
*Analyzing evaluating and crafting future scenarios				Analyzing evaluating and crafting future scenarios
	Acting autonomously	Self-management	Study self-directed and autonomous.	Self management and acting autonomously
	Using tools interactively			Using media interactively: the ability to bring a message across
			*Reflecting on the social and ethical responsibilities	Act as a sustainability example
		*Professional knowledge	Knowledge that provides a basis for <i>originality</i> in developing and/or applying ideas	Professional knowledge
*System thinking competence		*Intellectual qualities		Systems thinking and analytical/ integrating capacity
		*Research skills ICT skills		Research and ICT skills
Strategic competence Anticipatory competence		*Practical Skills	*Working in new and multidisciplinary contexts Working with incomplete/ limited information	Strategic competence and practical skills
Interpersonal competence	*Interacting in socially heterogeneous groups	*Social skills		Leadership and social skills
		*Communicative skills	*Communicating conclusions, to specialist and non specialist audiences	Communicative skills
*Normative competence				Normative competence

The final list of eleven competencies important for academic sustainability professionals can be found in Table 3-2. Some of the eleven competencies can be regarded general competencies, important for any type of higher education student, like 'Professional knowledge', 'Research and ICT skills' and 'Communicative skills'. Other competencies were only found in the sustainable development competencies articles like 'Analyzing and crafting future scenarios' and 'Normative competence'. During the further sorting of the eleven final competencies that were found, it was found that the competencies could be grouped in three clusters with each their own type of competencies. The first group was made of competencies surrounding interaction and social competencies, the second group around self-development and the final group around intellectual abilities and knowledge Table 3-3. .

Table 3-3: Overview of the eleven competencies important for sustainable development students arranged in the three clusters of competencies.

Competencies around interacting	Competencies around intellectual abilities	Competencies around self-development
<p>Leadership and social skills: Leadership, communicating and convincing: Capable of managing conflicts in socially heterogeneous groups.</p>	<p>Analyzing, evaluating and crafting future scenarios: Being able to think in and work with future scenarios (e.g. climate change scenarios) related to sustainability issues.</p>	<p>Act as a sustainability example: Communicate your sustainability values. Live sustainable and show it. Help to change the world around you.</p>
<p>Strategic competence and practical skills: The ability to design and implement interventions/ transitions towards sustainability. Including the ability to translate theory to practice and 'to get things done'. Managing projects in unfamiliar environments with deadlines and inconclusive evidence.</p>	<p>Systems thinking and analytical/ integrating capacity: Insight into context and working with <i>system models</i>: Analyzing complex systems across different <i>domains</i> (society, environment, economy) and across different <i>scales</i> (local to global + temporal).</p>	<p>Normative competence: Personal value development and the understanding of the ethics of current and future social systems. The ability to map and apply sustainability values, principles, goals, and targets.</p>
<p>Using media interactively: the ability to bring a message across: The use of language, information, knowledge, social media, and computers to smartly communicate a message to accomplish a <i>broader goal</i>.</p>	<p>Professional knowledge: Knowledge of the natural and or/ science disciplines and relevant policy and legislation; so that it provides a basis for creativity in developing and/ or applying ideas</p>	<p>Self management and acting autonomously: Discipline, sense of responsibility, insight into personal qualities and limitations, setting priorities</p>
<p>Communicative skills: Language proficiency, debating skills, skills for presenting to specialist and non specialist audiences.</p>	<p>Research and ICT skills: Research skills, statistical knowledge, GIS skills and high familiarity with other applied software.</p>	

Further categorization of the competencies took place by sorting the competencies in their clusters on 'difficulty': within the intellectual cluster, 'Analyzing, evaluating and crafting future scenarios' can be seen as a more advanced competence than professional knowledge. In figure 3-4 a visual representation of the three clusters of competencies is given. Interestingly, the higher level competencies in all the three clusters originate from papers that specifically focus on competencies for sustainable development. This is indeed the message in the different articles on competencies for sustainability professionals (Wiek et al.,2011; Bootsma van Vermeulen, 2011; Barth et al., 2007; Brundiers et al., 2009; Kates et al., 2001; Svanstro et al., 2008; Runhaar et al., 2005). A message that echoes what was also found in the transdisciplinarity discourse: sustainable development students need particular competencies in order to play a role in the transition towards sustainability and these competencies ask for sustainable development education that differs from conventional education. What competencies lecturers and students of sustainable development master's programmes consider important and what competencies are being taught in sustainable development master programmes will be analyzed in Section 4 Results.

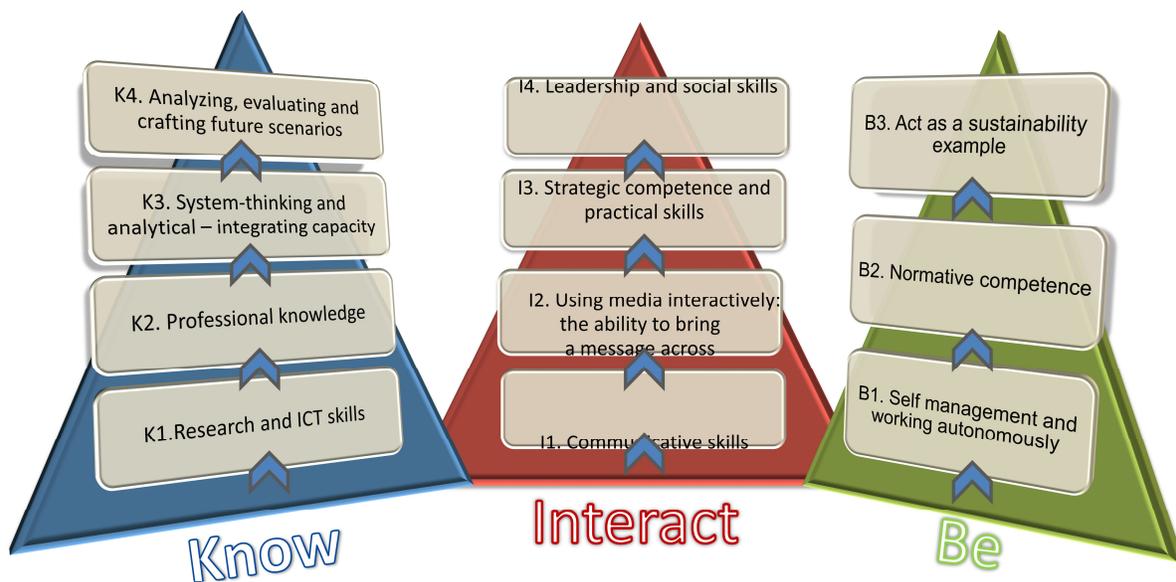


Figure 3-4: The three clusters of competencies for sustainability professionals: 'Interact', 'Be', 'Know'

3.4 PRACTICAL FACTORS AND FACTORS REGARDING CONTENT (THAT INFLUENCE THE STRUCTURE AND CONTENT OF SD MASTER'S PROGRAMMES)

A main objective of this study is to map how different sustainable development programmes worldwide are structured in terms of educational vision and content. During the literature study different factors that are considered to be of influence to the structure and content of sustainable development master's programme were found. The different 'explanatory variables' that were found were put into a question (Appendix D, Question 20;p.89) in the lecturer questionnaire of the survey, in this way a first overview of what factors influence the way sustainability is taught in sustainability master's programme could be made. The explanatory variables that were found in literature are briefly summarized in the following paragraphs. A division is made between practical factors and factors regarding content.

3.4.1 PRACTICAL FACTORS

Different explanations have been identified by scholars on why it is difficult to change a higher education programme's content and structure. A study in Ireland revealed that some programmes were unable to change its education towards a more interactive, student-based, approach because the financial situation prevented assigning more teachers, making smaller classes problematic (Tormey et al., 2008).

The subjects being taught in a programme highly depend on the subject expertise of the teaching staff (Tormey et al., 2008; Ferrer-Balas et al., 2005). The fact that lecturers in higher education are employed due to their subject expertise instead of teaching skills could also imply that some teaching styles or educational visions cannot be fully applied. This, because the teaching staff lacks the teaching skills to deal with the usually more demanding style of teaching (Tormey et al., 2008). Marincovich and Prostko (2005) did the same findings: "the disciplinary background of the teacher deeply influences how and what a teacher teaches (Marincovich and Prostko, 2005;p1). A topic that was often found on this subject was the 'resistance to change' in universities (Harpe and Thomas, 2009). Resistance develops because of the range of subcultures that exist in universities, the long-standing history of academic freedom, the tradition of criticism and the fact that there are often senior academics whose academic futures are assured and who do not want change (Arnold and Civian, 1997). This view is shared by Noonan and Thomas who state that "disciplinary traditions and organizational arrangements can impede the delivery of appropriated curriculums (Noonan and Thomas, 2004).

To ask implicitly about this topic the explanatory variable 'History of the Master's programme' was added to the lecturer questionnaire.

FACTORS THAT INFLUENCE SUSTAINABILITY PROGRAMME STRUCTURE AND CONTENT FROM INSIDE THE UNIVERSITY

- ❖ **The available finance for teaching staff**
- ❖ **The available expertise amongst the lecturers**
- ❖ **The history of the Master's programme**

Finally, a number of other factors were found that might influence the structure of a programme. This included the issue that skills like independent learning are often assumed a pre-existing ability in higher education (Laurillard, 2002) and the issue that Mode 2 education methods lead to a complex lecturer – student relationship that could become problematic (Scholz et al., 2006). These factors were considered too difficult to include in the questionnaires.

A factor from outside the university that influences sustainable development master's programme curriculums is a high demand for specific types of graduates from the labor market (Giacomelli et al., 2003) and the opposite, low job perspectives (Sherren, 2005). A final external factor that possibly has a large impact on the programme content is what the lecturers considered to be the dominant global sustainability issues and the dominant national sustainability issues in the countries where the programmes are situated.

FACTORS THAT INFLUENCE PROGRAMME STRUCTURE AND CONTENT FROM *OUTSIDE* THE UNIVERSITY

- ❖ **The students' job perspectives**
- ❖ **Explicit demands from the labor market for specific types of graduates**
- ❖ **The view of the leaders and staff of the Master's programme on what are the dominant local sustainability issues**
- ❖ **The view of the leaders and staff of the Master's programme on what are the dominant global sustainability issues**

3.4.2 FACTORS REGARDING CONTENT: VIEWS ON SUSTAINABLE DEVELOPMENT

All master's programmes that participated in this study have the term 'sustainability' or 'sustainable development' in their programme title and all the programmes teach in sustainable development from multiple social science and natural science disciplines (Paragraph 2.2.1). The main concept of study, sustainable development, however, is such a broad concept, interpretable in so many different ways, that there could be a substantial difference in how sustainable development lecturers and students think about sustainability and the path towards this goal. The view of lecturers on what sustainable development implies and what is needed for sustainable development definitely will have an influence on what is taught about sustainable development in sustainable development master's programmes.

In this paragraph an attempt is made to briefly summarize the academic debates on what sustainable development implies and what is needed for sustainable development. During literature study, citations were collected from advocates of each of the different views in these debates. The same citations were later used in the student and lecture questionnaires to ask sustainable development students and lecturers about their view on sustainable development. This allowed for an analysis in Section 4 of the question whether sustainable development students and lecturers from the different programmes have a shared or varying view on sustainable development (and if this view relates to the programme they are part of).

The most quoted definition of sustainable development: "*development which meets the needs of the present without compromising the ability of future generations to meet their own needs*", was written down for the first time in the 1987 WCED Brundtland Report (WCED, 1987). The term is very broad and inclusive, explaining part of its success (Huetting, 1990). Its broad and inclusive character, however, also made it a contested term: Every advocate of sustainable development agrees that society will have to change, but what level of change is actually necessary is one of the major debates.

3.4.2.1 ENVIRONMENTAL SUSTAINABILITY: WEAK VERSUS STRONG SUSTAINABILITY

Part of the sustainable development debates around sustainability and environmental functions and the depletion of natural resources is the debate between supporters of 'weak sustainability' and 'strong sustainability'. In the weak sustainability point of view, natural capital can be fully substituted by human capital as manufactured goods can fill the gaps that humans produce in the natural world (Goodland, 1995). Strong sustainability supporters point out that multiple natural processes are key to human existence like the ozone layer, photosynthesis or the water cycle cannot be replaced by any human-made capital (Rees, 1995; Hopwood et al., 2005).

WEAK SUSTAINABILITY

Sustainable development...

- I. ... includes *no conflict between the growth of the global market and environmental stability*; 'we can have an open vigorous and healthy trading system and achieve sustainable development' (WBCSD, 1998;p.6).
- II. ... includes that *natural and manufactured capital are in principle interchangeable*, with new technology mankind is able to fill human produced gaps in the natural world. In time the world can, in effect, get along without natural resources, *so exhaustion is just an event* (Solow, 1974;p48).

STRONG SUSTAINABILITY

Sustainable development...

- I. ... includes that *human-made capital cannot replace a multitude of processes vital to human existence* such as the ozone layer, photosynthesis or the water cycle. Moreover, non-human species, natural systems and biodiversity have rights and values in themselves (Rees, 1998; Naess, 1989).
- II. ... requires a *substantial reduction in living standards of the rich* and distribution of wealth more fairly in a world that *drastically reduces consumption and reduces the size of the global population* (Hopwood et al., 2005 P.40).
- III. ... includes *interspecies equity: the importance of biodiversity* (Haughton, 1999).

3.4.2.2 SOCIAL SUSTAINABILITY: INTER-GENERATIONAL AND INTRA GENERATIONAL EQUITY

Haughton (1999) has describes five equity principles that more or less include all the discussions in the sustainable development debate, (1) *intra-generational equity* (social justice), (2) *inter-generational equity* (futuraity) (3) *geographical equity* (transfrontier responsibility) and (4) *procedural equity* (people treated openly and fairly), (5) *interspecies equity* (importance of biodiversity; Haughton, 1999;p. 235). The first equity principle, intra-generational equity is about social justice in the wider sense of the term: not simply dealing with redistributive measures but seeking to address the underlying root causes social injustice (Haughton, 1999;p 235; WCED, 1987). Inter-generational equity refers to the second part of the Brundtland definition: '*without compromising the ability of future generations to meet their own needs*' (WCED, 1987). The third principle, geographical equity implies that government and business policy should focus not only on fixing local but also global sustainability issues. The external impacts elsewhere outside the jurisdictional domain of a particular country or out of sight for the public, are being ignored too often. This principle includes environmental dumping but also transfrontier acid deposition and deforestation. Governments, individuals and companies should not be able to shield behind political and jurisdictional boundaries from the negative impact of their activities. Fourth, procedural equity states in this view that political boundaries should not be used to allow polluters to be immune from persecution by affected people in other jurisdictions. "*Those affected by pollution in other countries should have the same rights to legal standing to defend themselves against polluters as those in host country would*" (Haughton and Hunter, 1994;p.9). This concept also includes a right

of equal access to information and possibilities for all societal groups to participate in decision-making processes (Haughton, 1994;p. 236). Geographical equity and procedural equity overlap significantly as they are about less powerful groups and their little means to fight against the external impacts of actions by governments and internationals. For this reason, these two categories were grouped together in a new category of citations named 'North south social justice and procedural equity'.

Finally, inter-species equity is about the critical importance of preserving ecosystem integrity and maintaining biodiversity (Haughton, 1994;p.236). Because environmental sustainability is already dealt with in the discussion between 'weak sustainability' and 'strong sustainability', citations representing the inter-species equity principle are not included in this study. The citations that represented social justice, North South social justice and intergenerational social justice can be found in the textbox below.

SOCIAL JUSTICE

Sustainable development...

- I. ... includes social justice: *intra-generational equity*: the distribution of resources and justice between present nations or social groups (Haughton, 1999, p. 236).

NORTH SOUTH SOCIAL JUSTICE and PROCEDURAL EQUITY

Sustainable development...

- I. ... includes *transfrontier* responsibility; *geographical equity* (Haughton, 1999; p.235).
- II. ... should recognize the *great differences in resource problems* that exist between *different countries and communities* instead of problematizing the sustainability of the global ecosystem as a whole. Alternatively, the *Third World needs to articulate alternative productive strategies* that would entail forms of environmental democracy, economic decentralization, and cultural and political pluralism (Escobar, 1995;p. 21)
- III. ... is a means to eradicate poverty, meet human needs and ensure that *all get a fair share of resources*. Social justice today and in the future is a crucial component of the concept of sustainable development (Hopwood et al., 2005, p.39).
- IV. ... also includes *procedural equity: people treated openly and fairly* (Haughton, 1999;p.6).

INTERGENERATIONAL SOCIAL JUSTICE

Sustainable development...

- I. ... includes the concept of 'social well-being': not only the well-being of those who are alive today, but also of those who will be here in the *future* (Dasgupta, 2010;p.7).
- II. ... includes intergenerational equity: meeting our present needs should not reduce the ability of future generations to meet their needs (Haughton, 1999; p.235).

3.4.3 THE TRANSITION TOWARDS SUSTAINABILITY

The kind of transition that is needed to achieve sustainable development is a point of endless debate. This is not surprising given the huge interests and difficulties surrounding the subject. Three different views on what is needed for sustainability, described by Hopwood et al. (2005), '*status quo*' and '*reform*', and '*transition*' are described.

STATUS QUO

Those who take a status quo approach recognize that something has to change but are convinced that no fundamental changes to society, means of decision making or power relations are necessary for solving the prevalent sustainability issues. Followers of this perspective see economic growth as part of the solution because 'economic growth' implies 'development'. Changes that do not ask for fundamental change of the dominant neo-liberal system like increased information, changing values, improved management techniques and new technology are considered the best ways to attain sustainable development by the supporters of this perspective (Hopwood et al., 2005).

REFORM

Supporters of the reform approach are critical about trends within society and the efforts by governments and businesses. This group, however, does not consider fundamental changes are necessary for sustainable development, because this group is convinced that a collapse of ecological or social systems is unlikely (Hopwood et al., 2005;p.40). They remain confident that society will make the necessary steps towards sustainable development. They believe that the root of the problem does not lie in the nature of society as a whole but in imbalances and a lack of knowledge and information. Policy and lifestyle will have to change one day but this change can be achieved over time and within the present social and economic structures. Governmental reform, technology and knowledge and market modifications are in their eyes the best ways to attain sustainable development (Hopwood et al., 2005).

TRANSFORMATION (SOCIETAL, VALUE AND LIFE STYLE CHANGE).

Those who represent the transformation consider the fact that humans interrelate and relate with the environment, and the fundamental characteristics of society, as the roots of a mounting environmental and societal crisis (Rees, 1995). Transformationists argue that in order to avoid a crisis or even a future collapse, transformations are needed in society and in the human relations with the environment. Reform does not suffice because the problems are seen as being situated within the 'very economic and power structures of society'. Most transformationists see a need for 'social and political action' in which societal groups like the poor, the working class, women and indigenous groups should be involved (Hopwood et al., 2005). It should be noted that supporters of this group include advocates that think from an environmental point of view, those that look from a societal point of view and those that look from both of these views.

Only a maximum number of citations could be included to the questionnaire. Because of this, and because including all three approaches would make the distinctions between the citations more blurred, it was decided upon to ask students and lecturers only on the two most opposing views: 'Status quo' and 'Transformation'. The citations for these two points of view can be found on the next page.

STATUS QUO

Sustainable development...

- I. .. requires that there is sufficient money to be made in it for businesses. Partnerships between governments, businesses, environmentalists and scientists could enable technology development (Dryzek, 1997, p. 142; Alier, 2003; Hopwood et al., 2005 p.40)
- II. .. recognizes that the '*downward spiral of poverty and environmental degradation*' calls for a *different form of growth*, 'changing the quality of growth, meeting essential needs, merging environment and economics in decision making' (WCED, 1987, p.49; Hopwood et al., p.40).

TRANSFORMATION

Sustainable development...

- I. .. requires a *transformation of society and/or human relations* with the environment to avoid a *mounting crisis and even a possible future collapse*. Many of the *problems are located within the very economic and power structures of society* which are not primarily concerned with human well-being or environmental sustainability (Hopwood et al., 2005, p. 45).
- II. .. includes the view that the *mounting crises in the environment and society are interconnected* and the social and environmental systems *risk breakdown if radical change does not occur..* (Rees, 1995; Hopwood et al., 2005, p. 46).
- III. .. requires mainly a more *fundamental transformation in underlying values and attitudes* to create substantial change (Robinson, 2003, p. 377)

The literature study for this paragraph thus identified seven different views on sustainable development and the path towards achieving this goal. Using the sixteen citations from acknowledged advocates of the seven different views, the students and lecturers of the master's programmes will be asked to indicate the extent to which they agree upon the citations.

4 RESULTS

In this Section the survey results are described and discussed. A brief summary of the student and lecturer response can be found in paragraph 4.1.

The rest of Section 4 focuses on presenting and analyzing the three different elements of the way sustainable development is taught: the educational visions, the competencies and which sustainability issues. The three elements are each described in an own paragraph, educational visions in 4.2 (p.31), competencies in 4.3 (p.39), sustainability issues in 4.4 (p.52). For each of the three elements is first the *perceived representation* of the element in the programmes discussed followed by how the students and lecturers *ideally* like to see the representation of the educational element in their master's programmes. Or, slightly different, which educational element they consider the *most important* for teaching a future sustainability professional.

All have the three paragraphs have same structure:

- ❖ **The first subparagraphs** provide an overview of the answers that were given by the all students and all lecturers on the topic. Where relevant explanatory factors are introduced here as well.
- ❖ **In the later subparagraphs** the results are split up in into five groups of master's programmes (Table 4-1) to explore whether it is possible to unravel the variety in scores that is identified in the overview in Subparagraph 1 to differences between different programme groups.

Looking at the results of the different programme groups on the different variables allows for a further analysis of possible connections between the different elements (visions, competencies, issues) and the explanatory factors.

The five groups of programmes were created by considering the geographical region of the programmes, the development state of the country of the programme and the number of responses: Stellenbosch and TERI universities were given a separate group as they would otherwise dominate the results of the other programmes in developing states. The programmes in the developed states are conveniently abbreviated as 'HIC1', 'HIC2' and 'HIC 3' (Higher Income countries), the groups of programmes in the developing states as 'LIC/MIC1' and 'LIC/MIC2' (Lower and Middle Income countries). The groups are constituted of both the input of the lecturers and the students in these regions. The lecturers are the most knowledge about their programmes (they *designed* them after all) but the students are the one that *experience* the actual teaching and the ones that can reflect on what they have *learned*. Combining both in for the different regions therefore gives the most complete image.

Table 4-1: The five groups used in the further analysis (HIC: Higher Income countries, LIC/MIC: Lower and Middle Income countries)

Groups of programmes	Number of participating students and lecturers
HIC1: European Universities	128
HIC2: North American Universities	48
HIC3: Japan and Oceania	44
LIC/MIC1: Stellenbosch and TERI universities	66
LIC/MIC2: Africa, Latin America and South Asia	39

To improve the readability of this section, the results on the different elements are discussed in the same paragraphs right after the results are described. In each paragraph is referred to the graphs that represent the results. Sometimes, when relevant, additional differences between programme groups are tested on significance, these results cannot be found back in the graphs (these only include programme group <> average tests), the test that was used for this additional exercise is given in brackets in the text e.g. '(Mann-Whitney U: $\alpha = 0.05$)', where 0.05 refers to the standard level of significance that is used.

Before describing the results of the analysis, Paragraph 4.1 defines the study population of this survey. A further description of the students that participated can be found in Appendix A (p.1) where can be read more about their age, region of birth, academic background and why they decided to do this master's programme. A similar overview, also including what tasks lecturers fulfill, is given of the lecturers in Appendix (B 80). To get a good view of from what survey questions the results in this Section are derived, it is suggested to also scroll briefly through Appendix C and D, the questionnaires, at this point in the thesis.

4.1 OVERVIEW OF THE RESPONSE

The survey received input from 287 students and 54 lecturers from 34 universities (Figure 4-1; Table 4-2). Programmes from Europe account for 41% of the total student response and 33% of the total lecturers response. Utrecht University (66 stud./9 lect.) and Karl-Franzens-Universität Graz (22/2) are the biggest contributors to the survey in Europe.

The programmes from Asia account for 25% of the total student response and 32% of the lecturer response, the biggest contributors being TERI University (17/2) and Hiroshima University (19/6).

Africa accounts for 17% of the total students response and 9% of the lecturers response mostly accountable to Stellenbosch University (41/2). The remainder of the input came from Oceania and Latin America with respectively 2% and 1% of the total student response and both 4% of the total lecturer response.

The number in front of the university names in Table 4-2 indicates to which of the geographical programme groups (used in the analysis, see Paragraph 4.1.1) the university belongs.



Figure 4-1: Overview of the participating sustainability master's programmes, excluding the universities from which only a lecturer replied).

Table 4-2: An overview of the programme size and the student and lecturer response for each programme. The numbers in front of the university names indicate to which of the programme groups, that were used in the analysis, the university belongs (D.D. is Data Deficient).

	Universities	Students enrolled 2011-2012	Student response	Lecturer response
NORTH AMERICA 15% of total student response 19% of total lecturer response	2. Arizona State University, Phoenix, US	113	12	8
	2. Colombia University, New York, US	45	9	
	2. University of Minnesota, Minneapolis, US	18	5	-
	2. University of Florida, Gainesville, US	8	6	1
	2. Emory University, Atlanta, US	16	4	-
	2. University of Winnipeg, Canada	17	3	-
	2. University of Denver, US		3	-
	2. University of Waterloo, Canada	-	-	1
LATIN AMERICA 1% of total student response 4% of total lecturer response	5. CATIE, Costa Rica	32	3	-
	5. Universidade Federal Rural do Rio de Janeiro, Brazil	20	1	-
	5. Pontical Catholic University Rio, Brazil	-	-	1
	5. University de Los Andes, Colombia	-	-	1
EUROPE 41% of total student response 33% of total lecturer response	1. Utrecht University, the Netherlands	200	66	9
	1. Karl-Franzens-Universität Graz, Austria	300	22	2
	1. University of Leipzig, Germany	16	12	2
	1. TCD and UCD, Dublin, Ireland	27	6	1
	1. Oxford University, UK	38	5	1
	1. Ca' Foscari University of Venice, Italy	D.D.	5	2
	1. University of Turku, Finland		1	-
	1. Lund University, Sweden	-	-	1
AFRICA 17% of total student response 9% of total lecturer response	4. Stellenbosch University, South Africa	106	41	2
	5. Université Cheikh Anta Diop (UCAD), Senegal	23	1	1
	5. University of Botswana, Botswana	12	2	-
	5. University of Ibadan, Nigeria	9	4	1
	5. Nnamdi Azikiwe University, Nigeria	-	-	1
ASIA 25% of total student response 32% of total lecturer response	4. Teri University, India	27	21	2
	3. Hiroshima University, Japan	47	19	6
	3. University of Tokyo, Japan	22	11	3
	5. University of Peradeniya, Sri Lanka	28	8	1
	5. Thsinghua University, China	38	5	2
	5. Peking University, China	24	5	3
	5. BRAC Development Institute, Bangladesh	11	2	-
OCEANIA 2% of total student response 4% of total lecturer response	3. Macquarie University, Sydney, Australia	D.D.	5	1
	3. James Cook University, Australia	-	-	1
	Total	≈ 880	287	54

4.2 REPRESENTATION OF EDUCATIONAL VISIONS

Research question: *Which educational visions currently dominate (and should ideally dominate) the sustainable development master's programmes?*

4.2.1 OVERVIEW OF THE REPRESENTATION OF EDUCATIONAL VISIONS

Students and lecturers were asked to indicate representation of the five educational visions in their sustainable development master's programme (Appendix C, p.90, Appendix D, p.98). Figure 4-2 presents the results of the answers given by the students and lecturers.

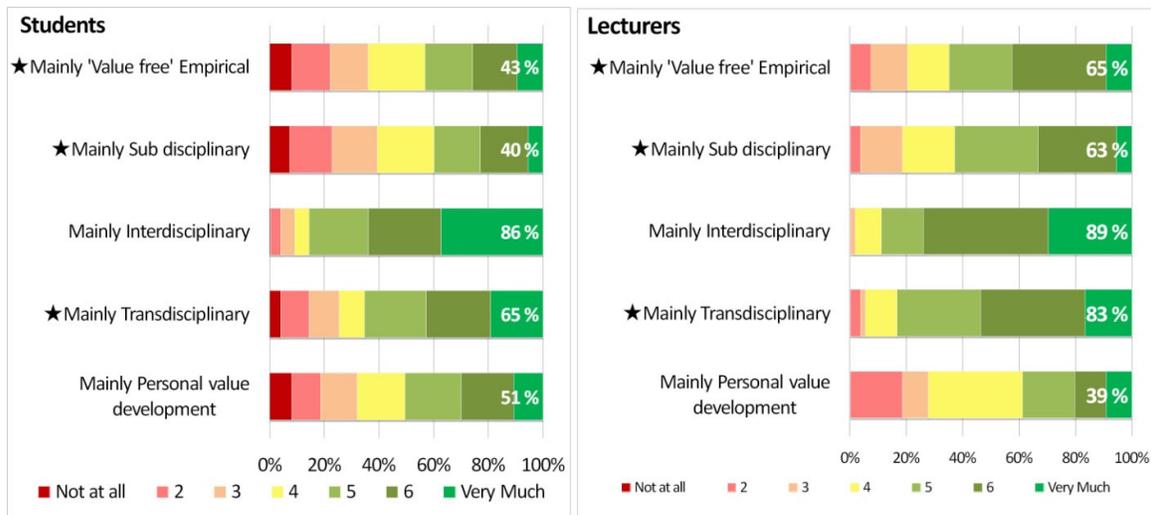


Figure 4-2: An overview of the representation of the five educational visions in the Sustainable development Master's Programmes according to students (n=271) and lecturers (n=54). The percentages show the share of the three highest scales (5, 6 and 7 'Very Much'). The ★-symbol indicates a significant difference between the students' and lecturers' score on the vision (Mann-Whitney U: $\alpha = 0.05$).

The students and lecturer response show the same tendencies: e.g. the *Interdisciplinary* educational vision is the best represented vision in the master's programmes, followed by the *Transdisciplinary* vision. The high representation of the *Interdisciplinary* educational vision is impressive but was to be expected: only interdisciplinary master's programmes were selected for the survey.

The relatively high representation of *Transdisciplinarity* is an interesting result. This is the vision promoted by many as the way to go in sustainable development research and education (Paragraph 3.2.3). The students, however, perceive the representation of *Transdisciplinarity* in their programmes significantly lower than their lecturers do. This is also the case for the *Empirical* and *Sub discipline* visions. Students, possibly, do not recognize these empirical and sub disciplinary elements of education as such. The opposite may be said about the *Personal value development* vision as the lecturers' score is notably (but not significantly) lower than the students. The comparable number of students that filled in 'not at all' and the 'very much' for the *Empirical*, *Sub disciplinary* and *Personal value development* visions could indicate that these visions are well presented in some programmes but not in others.

The next paragraph is used to further explore the different scores on the educational visions by analyzing the results for the five groups of programmes.

4.2.2 REPRESENTATION OF THE EDUCATIONAL VISIONS IN THE PROGRAMME GROUPS

To explore the difference whether some visions are better represented in some groups of programmes than others, the results are now categorized into the five programme groups and compared to the average score (all students and lecturers-group) (Figure 4-3).



Figure 4-3: An overview of the representation of the five educational visions in Sustainable development Master's Programme in the five programme groups. The percentages show the share of the three highest scales (5, 6 and 7 'Very Much'). The groups are compared to total students and lecturers score (ALL STUDENTS & LECTURERS). The ★-symbol

indicates a significant difference between this group' (with the symbol in front) their score and the 'All' group score (the average) (Mann-Whitney U: $\alpha = 0.05$).

EMPIRICAL

Programmes in the Japan and Oceania group focus significantly *more* than average on the empirical vision. The representation of the empirical educational vision appears variable in the programmes in Europe and the LIC/MIC2 group, but higher than average (figure 4-4). The vision is represented significantly *less* than average in the North American and the Stellenbosch/TERI programmes.

SUBDISCIPLINARY

The sub disciplinary vision is not found to be prominent, or is not recognized as such, in any of the groups of programmes: all groups show a mixed score. The vision highest representation can be found in the European programmes, this representation is significantly *higher* than those of North America and Stellenbosch/TERI (Mann-Whitney U $\alpha = 0.05$). The vision is represented significantly *less* than average in the North America programmes. Stellenbosch/TERI score also below average on sub disciplinary.

INTERDISCIPLINARY

The scores on interdisciplinarity are all very high (% => 80). The representation of this vision is significantly higher than average in the Stellenbosch and TERI universities' programmes. The North American programmes also score notable (but not significantly) *higher* than average on interdisciplinarity. The European programmes have the lowest representation, not only significantly *lower* than average but also significantly *lower* than all other groups (Mann-Whitney U $\alpha = 0.05$).

TRANSDISCIPLINARY

Transdisciplinarity scores are relatively high (% => 73) except for the Europe programmes that score significantly *lower* than average. Stellenbosch and TERI have a representation of transdisciplinarity in their programmes that is significantly *higher* than average.

PERSONAL VALUE DEVELOPMENT

The results on this vision are mixed. The representation at Stellenbosch and TERI is significantly *higher* than average. The second and third best representation can be found in the second LIC/MIC group and Japan and Oceania. North America scores below average and Europe significantly *below* average. The personal value development vision appears to be largely absent in programmes in Europe or is not identified as such by the respondents.

A summary of the representations in the different programmes can be found in Table 4-3. The North American Programmes show a remarkably low representation of the **Empirical** and **Sub disciplinary** visions but do show a high representation of **Transdisciplinarity**. The four programmes in the Japan and Oceania group show a high representation of **Transdisciplinarity** and they are the only group that has a high representation of the empirical vision. **Transdisciplinarity** appears to be well implemented too at TERI and Stellenbosch, as is personal value development. These programmes appear to include relatively little **Empirical** and **Sub disciplinary** ways of teaching. The LIC/MIC2 programmes (Africa, Latin America and South Asia) score relatively high on all visions (all above average), with notably high scores on the **Empirical**, **Interdisciplinary**, **Transdisciplinary** and **Personal value development** visions.

Table 4-3: Representation of the educational visions in the different groups of programmes

Programme \ Competence	HIC: Europe	HIC: North America	HIC: Japan and Oceania	LIC/MIC: Stellenbosch and TERI	LIC/MIC: Africa, Latin America, South Asia
Empirical	Above average	Low	High	Low	Above average
Sub disciplinary	Above average	Low	Low	Low	Above average
Interdisciplinary	High	High	High	High	High

Transdisciplinary	Below average	High	High	High	High
Personal value	Low	Above average	Above average	High	Above average

4.2.3 THE RESPONDENTS' PREFERRED BALANCE OF EDUCATIONAL VISIONS

To get a view of whether the type of teaching that students receive in their programmes resembles the way they would prefer to be taught in their *ideal* sustainable development master's programme, the students were asked upon their ideal balance of educational visions. Similarly, lecturers were asked how important they consider the 5 visions in the teaching of (future) academic sustainability professionals.

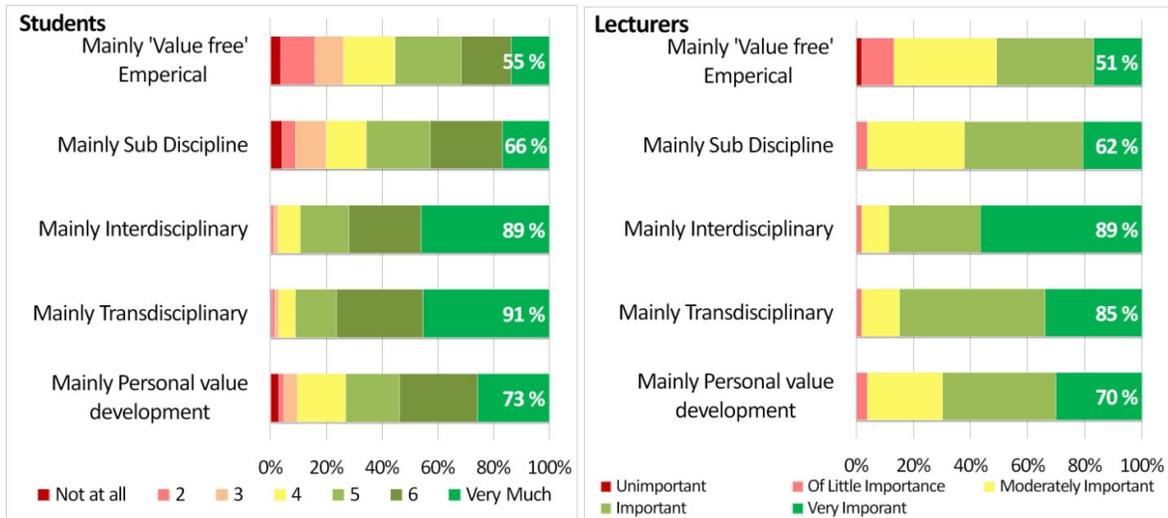


Figure 4-4: an overview of the representation of the five educational visions in an ideal Sustainable development Master's Programme according to students (n=271) and lecturers (n=53). The percentages show in the students graph the share of the three highest scales (5, 6 and 7 'Very Much') and in the lecturers graph the share of the two highest scales ('Important', 'Very important').

Both groups were asked a slightly different question (ideal balance in programme <-> which vision most important for teaching). Interestingly, the results show a similar pattern. According to both lecturers and students sustainable development master's programmes should be *Interdisciplinary* and *Transdisciplinary*. *Personal value development* should have a smaller but still prominent role in the programme too. Students and lecturers views on the representation of the *Value-free* and *Sub discipline* perspective in the ideal master's programme are mixed but the *Sub disciplinarity* vision received higher scores than the *Empirical* vision from both students and lecturers.

Table 4-4: Balance in current programmes versus the preferred balance of educational visions according to students and lecturers The percentages show in the students graph the share of the three highest scales (5, 6 and 7 'Very Much') and in the lecturers graph the share of the two highest scales ('Important', 'Very important').

Programme \ Competence	Students <i>perceived</i> current balance	Students <i>preferred</i> balance	Lecturers <i>perceived</i> current balance	Lecturers <i>importance of vision in teaching SD</i>
Empirical	43%	55%	65%	51%
Sub disciplinary	40%	66%	63%	62%
Interdisciplinary	86%	89%	89%	89%
Transdisciplinary	65%	91%	83%	85%
Personal value	51%	73%	39%	70%

Comparing how students would like to see the teaching in their programme with the balance of visions they currently encounter, shown Table 4-4, the students' needs appear to be only satisfied for the **Interdisciplinary** vision. This, however, could be a too bold conclusion: considering the much higher scores from the lecturers for the current balance of educational visions. The low student scores on the perceived current balance could also have also to do with the possibility that it is hard for students to identify the different visions in their programme. Interestingly, the students are interested in being taught with all visions, but appear to prefer a programme that is highly **Interdisciplinary** and **Transdisciplinary** but also including **Personal Value** development and **Subdisciplinarity**, the least interest is in purely **Empirical** education.

Interpreting the lecturers' score on how important they consider the different visions (Table 4-4, right half), one could conclude that programmes should focus more on **Personal value development** and less on purely **Empirical knowledge production**. Students and lecturers in fact indicate the same ideal balance of visions: A highly **Interdisciplinary** and **Transdisciplinary** programme that also focuses considerably on **Personal value development**.

4.2.3.1 THE STUDENTS' PREFERRED BALANCE OF EDUCATIONAL VISIONS PER PROGRAMME GROUP



Figure 4-5: An overview of the representation of the five educational visions in the ideal Sustainability Master's Programme of the students of the five groups. The percentages show the share of the three highest scales (5, 6 and 7 'Very Much'). The ★-symbol indicates a significant difference between this group's (with the symbol in front) score and

In this paragraph only the views of the students of the different groups are investigated. The lecturers' views could not be included in the results because in the questionnaire of the lecturers a different question with different answer categories was asked.

Table 4-5: Representation of the educational visions in the different groups of programmes versus the ideal representation of the visions according to students. The percentages show the share of the three highest scales of the seven point scale of representation (5, 6 and 7 'Very Much').

Programme \ Educational vision	HIC: Europe		HIC: North America		HIC: Japan and Oceania		LIC/MIC: Stellenbosch and TERI		LIC/MIC: Africa, Latin America, South Asia	
	Current	Ideal	Current	Ideal	Current	Ideal	Current	Ideal	Current	Ideal
Empirical	54%	55%	25%	38%	64%	64%	30%	54%	59%	70%
Sub disciplinary	54%	72%	25%	59%	43%	64%	36%	62%	46%	63%
Interdisciplinary	80%	85%	94%	97%	84%	85%	92%	93%	87%	93%
Transdisciplinary	52%	88%	77%	85%	73%	94%	88%	98%	72%	93%
Personal value	26%	54%	46%	77%	64%	82%	77%	95%	62%	85%

EMPIRICAL

The **Empirical** vision score received the lowest scores from all groups (except for LIC/MIC2 that gave the **Sub disciplinary** their lowest score). The North American students' preferred representation of this vision is significantly *lower* than average. Students in Japan and Oceania and in the LIC/MIC2 group prefer a slightly higher than average representation of the **Empirical** vision (Figure 4-5).

SUBDISCIPLINARY

Students would like to see **Sub disciplinary** teaching in their ideal master's programme but do not want this vision to dominate (the percentages fluctuate around the 60%). Students in Europe, however, prefer a significantly higher representation (72%) than the students from North America and Stellenbosch/TERI (Mann-Whitney U $\alpha = 0.05$). Looking back at the current representation (4.2.2), the representation of the **Sub disciplinary** vision is actually significantly *higher* in Europe than in North America and Stellenbosch/TERI (Mann-Whitney U $\alpha = 0.05$).

INTERDISCIPLINARY

The preferred balance of **Interdisciplinarity** is equally as high as the perceived balance in the current programme structures (% => 80, Table 4-4). The three groups with the highest preferred presentation for this vision are also the groups with the highest current representation of **Interdisciplinarity**: North America, Stellenbosch/TERI and LIC/MIC2.

TRANSDISCIPLINARY

While the **Transdisciplinary** vision showed to be relatively well represented in the groups of programmes (% => 73, except for Europe: 54%), the students preferred share of **Transdisciplinary** teaching in their programme is notably high for all groups (% => 85%). Stellenbosch and TERI students' preferences for this vision are significantly *higher* than average. The actual representation of **Transdisciplinarity** in these two programmes the highest, significantly *higher* than average (98%).

PERSONAL VALUE DEVELOPMENT

The representation of the [Personal value development](#) vision came out to be highly variable (see Paragraph 4.2.2). What can be observed now, however, is that students from all but one group prefer a relatively high representation of [Personal value development](#) teaching in their programmes. The one group is Europe where the students prefer a significantly *lower* representation than average of [Personal value development](#) in their programmes. Fortunate for them, as was already seen in Paragraph 4.2.2, the perceived representation of the vision in the European programmes is significantly lower than all other groups (26%). The students from Stellenbosch and TERI' preferred representation is significantly *higher* than average which also matches with the actual representation of the vision in these programmes that is also significantly *higher* than average. The LIC/MIC2 programmes from Latin America, Africa and South Asia, have the second highest preference for [Personal value development](#) teaching and, indeed, have the second highest representation in Paragraph 4.2.2.

4.3 SUSTAINABLE DEVELOPMENT COMPETENCIES

Research question: *Which competencies are being taught (and should ideally be taught) in the sustainable development master's programmes?*

4.3.1 OVERVIEW OF THE REPRESENTATION OF THE SUSTAINABLE DEVELOPMENT COMPETENCIES

By filling in a 7 point scale ranging from 'not at all' to 'very much', students and lecturers had to indicate the extent to which the 11 competencies of the KIB framework (Figure 4-6Figure 4-7) are being taught in their sustainable development master's programmes.

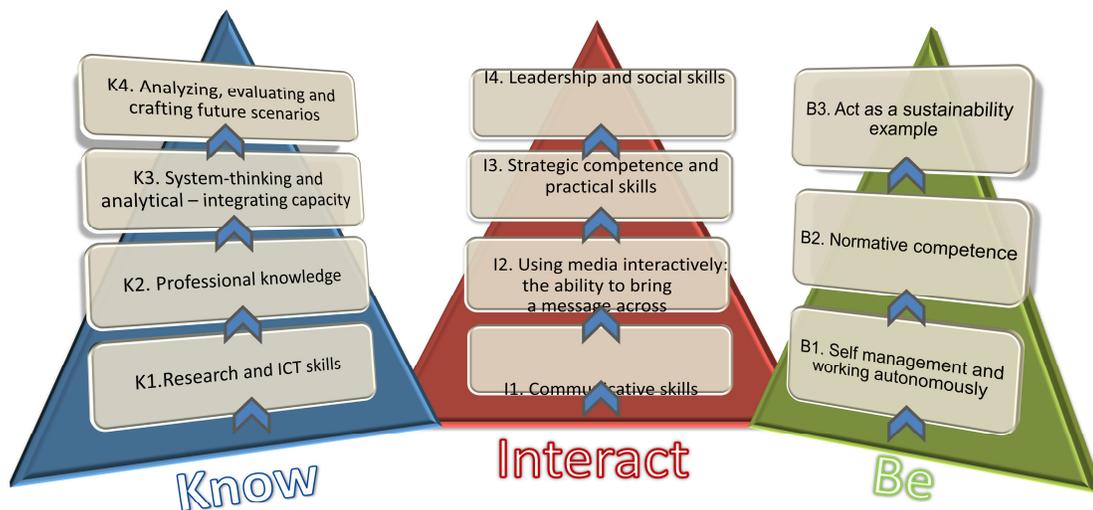


Figure 4-6: KIB Framework The three clusters of important competencies for sustainability professionals: 'Know', 'Interact', 'Be'.

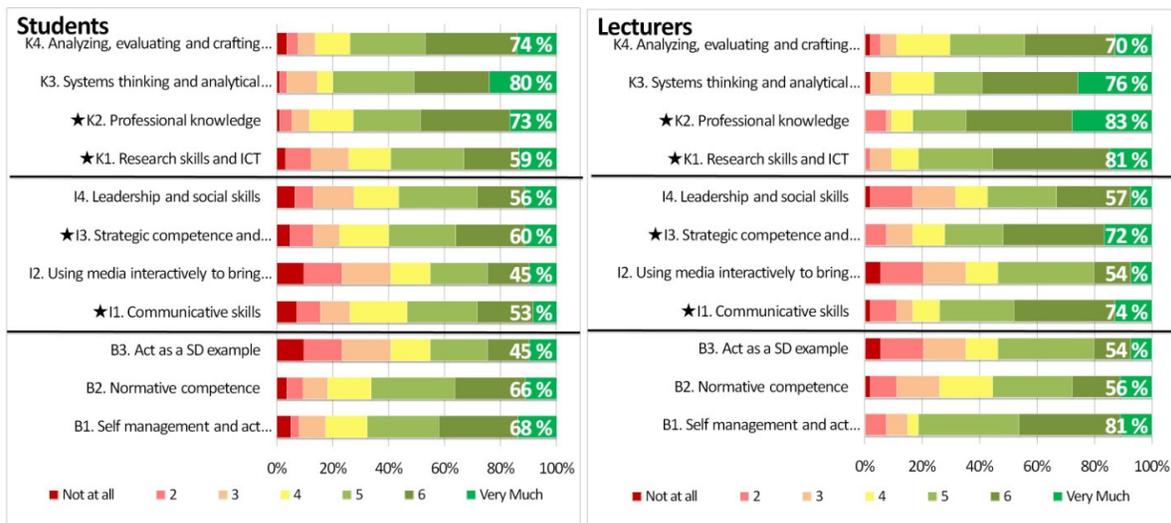


Figure 4-7 Extent to which competencies are being taught in the sustainability master's programmes according to students (n = 275) and lecturers (n = 54). The percentages show the share of the three highest scales (5, 6 and 7 'Very Much').

The 'Know' cluster of competencies (K4-K1) appears to be the best represented cluster of competencies compared to the other clusters (Figure 4-7). Notably, the lecturers' scores on the representation of K1 'Professional knowledge' and K2 'Research and ICT Skills' are significantly *higher* than the students' scores.

The 'Interact' cluster (I4-I1) has a variable representation in the programmes: half of the students filled in the scores '5', '6' and 'very much' which could imply that some programmes do give serious attention on these competencies but others do not. The student results differ from the lecturer results. The scores given by the lecturers on the representation of I3 'Strategic competence' and I1 'Communicative skills' are significantly *higher* than the students' score.

The student's scores on the 'Be' cluster vary for B3 'Act as a SD example'. The remaining lower level competencies of the 'Be' cluster, B2 'Normative competence' and B1 'Self management and acting autonomously' are reasonably well represented in the programmes according to the students. The lecturers scored the competencies slightly different: B3 and B2 and a high representation of B1 'Self management and acting autonomously'.

4.3.2 OVERVIEW OF THE RESPONDENTS' VIEWS ON THE MOST IMPORTANT COMPETENCIES FOR A SUSTAINABILITY PROFESSIONAL

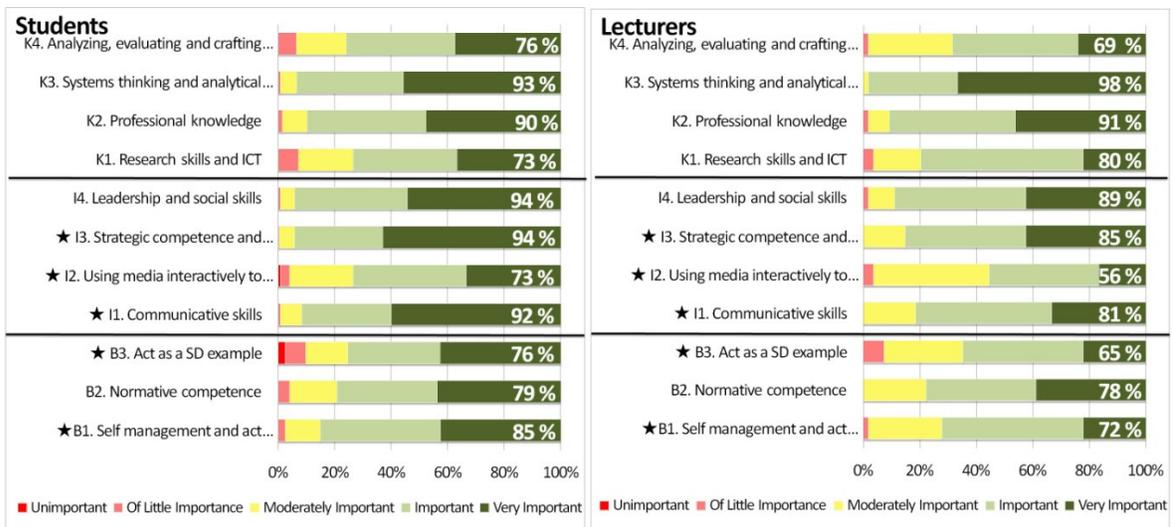


Figure 4-8: Extent to which competencies are considered important for academic sustainability professionals according to students (n = 275) and lecturers (n = 54). The percentages show the share of the respondents that filled in the categories 'important' or 'very important'. The ★-symbol indicates a significant difference between the rating by students and by lecturers on that certain topic (Mann-Whitney U: $\alpha = 0.05$).

Students appear to consider all competencies important for their later career as a change agent: for each competence the 'important' and 'very important' categories make out for at least 73% of the scores given by students. The lecturers consider seven of the eleven competencies important (>72%). The competencies considered the most important for sustainability professionals to be able to accelerate change towards a sustainable future are K3 'Systems thinking and analytical-integrating capacity', K2 'Professional knowledge', I4 'Leadership and social skills', I3 'Strategic competence and practical skills' and I1 'Communicative skills'. Two competencies appear to be considered the least important: I2 'Using the media interactively to bring a message across' and B3 'Act as Sustainability example'.

Whereas students gave a higher score than the lecturers on all competencies except K1 'Research and ICT skills', the results of the students and lecturers follow the same pattern. The same competencies score high and the same competencies score low. B1 'Self management and acting autonomously' is the only exception to this pattern. Interestingly, the high level competencies of each cluster (K4, I4, B3) are not necessarily considered the most important competences.

Four competencies are considered significantly less important by the lecturers than by the students: I3 Strategic competence and practical skills', I2 Using the media interactively to bring a message across', I1 Communicative skills', B3 Act as a SD example and B1 Self management and acting autonomously. K1 Research skills and ICT is the only competence that is considered more important by the lecturers than by the students.

4.3.2.1 OVERVIEW JOB EXPECTATION FOR STUDENTS ACCORDING TO STUDENTS AND LECTURERS

Since one of the main objectives of this study is to identify what students want and should learn in their master's programme in order to be successful in their further career in the sustainability field, it is relevant to investigate what kind of jobs the students think to fulfill when they are full grown sustainability professionals (and what the lecturers think the students will do). It would be provide an incomplete view on the subject if no attention is given on *for what jobs* do the students want to learn certain competencies? And which jobs have lecturers in mind what their students will do in ten years?

In descending order, the top 5 of jobs were students expect themselves to be working are (1) at a **consultancy firm**, (2) at a **NGO**, (3) as a **policy maker**, (4) at a **company** working on greening the company and (5) working in their **Own company** (Table 4-6). Lecturers also expect their students to work in **consultancy firms**, **NGOs** and as **policy makers** but also see at lot more students working **outside the sustainability field**. What lecturers expect their students to do differ remarkably from the students' expectations. Four expectations differ significantly: (1) lecturers expect significantly less students to be working at an **NGO**, (2) significantly less students to have started their **own company**, (3) significantly more students to become a **scientist** and (4) significantly more students to be working **outside the sustainability field** than students do.

Table 4-6: Expected future job of students versus what lecturers expect their students to do in 10 years. Mean and standard deviation is given. The difference between the mean expectations is tested with help of a Student's t-test ($\alpha=0.05$).

Expected future jobs	
Students (N= 287)	Lecturers (N= 53)
1.Consultancy 18.9 (14.7)	1.Consultancy 17.9 (9.3)
2. ★ NGO 18.2 (18.0)	2.Policy maker 16.0 (9.4)
3.Policy maker 15.7 (18.2)	3. ★ NGO 14.2 (11.0)
4.Greening companies/CSR 14.7 (15.2)	4.Greening companies/CSR 13.3 (7.4)
5. ★ Own company 13.15 (18.0)	5. ★ Job outside the SD field 12.1 (9.8)
6.Lecturer 8.5 (12.9)	6. ★ Scientist 9.7 (6.4)
7. ★ Scientist 6.8 (12.2)	7.Lecturer 8.9 (6.3)
8. ★ Job outside SD field 4.11 (9.5)	8. ★ Own company 8.0 (5.1)
100	100

Given the fact that both the students and lecturers identified the same top 5 (with similar mean scores) of the jobs students want and lecturers expect that the students will do in 10 years, the differences in views between the two on *which competencies are considered important for the students for their future careers* cannot be explained by different job expectations.

4.3.3 REPRESENTATION OF SUSTAINABLE DEVELOPMENT COMPETENCIES IN THE DIFFERENT PROGRAMME GROUPS

To get insight in which programmes focus on which competencies, and to unravel the mixed scores on some competencies, the results of *both the students and lecturers* are split in the five programme groups and discussed cluster by cluster (Know, Interact, Be).

THE 'KNOW' CLUSTER

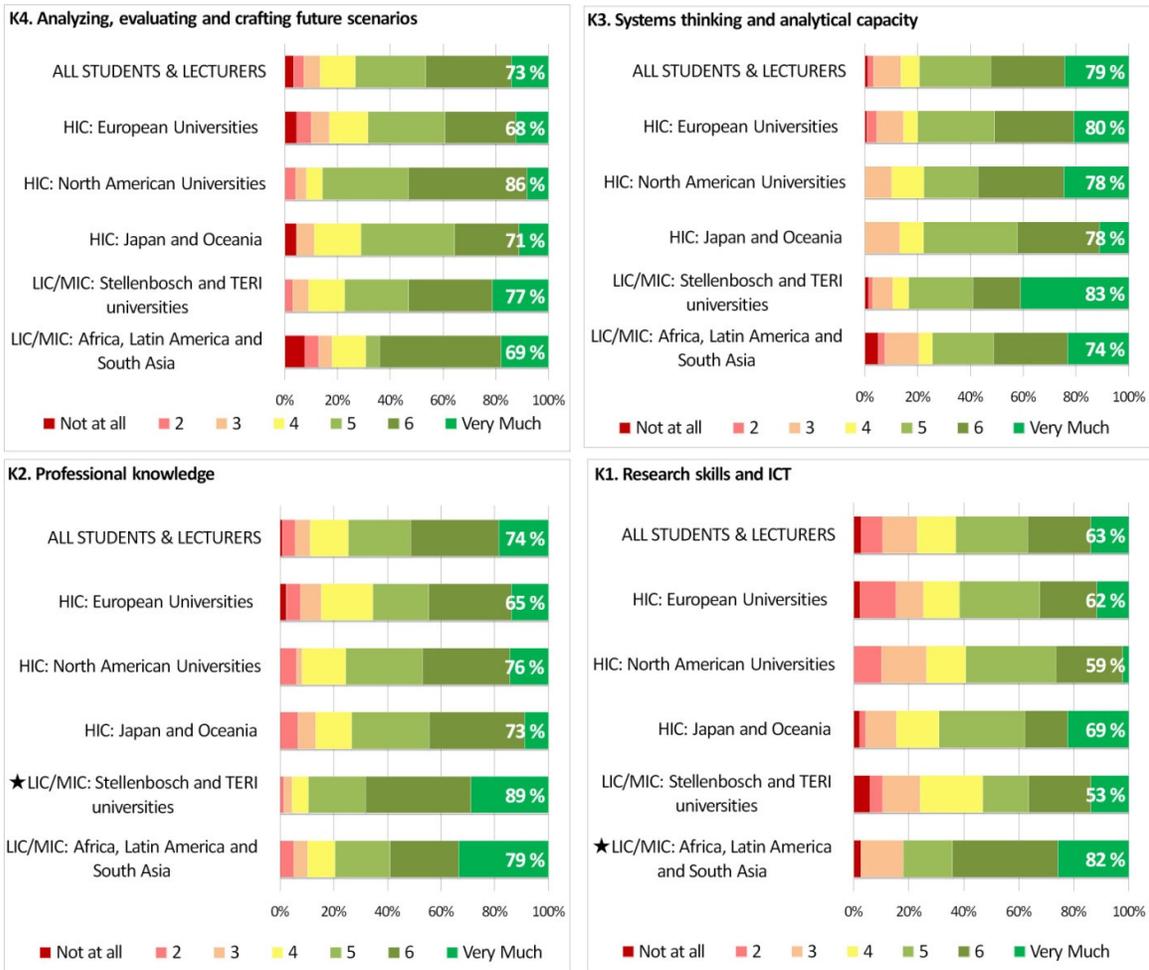


Figure 4-9: Extent to which 'Know' competencies are being taught in the five groups of programmes according to students and lecturers (n = 325). The percentages show the share of the three highest scales (5, 6 and 7 'Very Much'). The ★-symbol indicates a significant difference between this group's (with the symbol in front) score and the 'All' group's score (Mann-Whitney U: $\alpha = 0.05$).

Relatively little variation is found in this cluster of competencies: with a few exceptions, the different group scores on each competence do not differ a lot from the average score. K3 'Systems thinking and analytical capacity' is the best represented competence of all the three clusters together.

High level competence K4 is distributed very similarly in all programmes (around 73%). The lowest representation is in Europe (68%) but the difference between this group and HIC3 and LIC/MIC2 are small. The highest representation, but not significantly higher than average or one of the other groups, is to be found in the North American programmes (86%).

High level competence K3 has an equally high distribution in all groups of programmes. The lowest score is given by the students and lecturers of the LIC/MIC2 Africa, South Asia and Latin America group.

K2 'Professional knowledge' (Professional knowledge of the natural and social science disciplines and of the relevant laws and regulations) scored relatively high with 74% for the three highest categories. The competence scores notably better in the LIC/MIC programmes than the HIC programmes. The score given by the students and lecturers the LIC/MIC1 Stellenbosch and TERI programmes is significantly higher than average and significantly higher than in all three HIC groups (*Mann-Whitney U* $\alpha = 0.05$). Professional knowledge is also well represented in the other LIC/MIC group but that score only differs significantly from Europe.

K1 'Research skills and ICT' is the lowest scoring competence of the four in all programme groups except LIC/MIC2. The score of LIC/MIC2 is significantly higher than average (82%).

THE 'INTERACT' CLUSTER

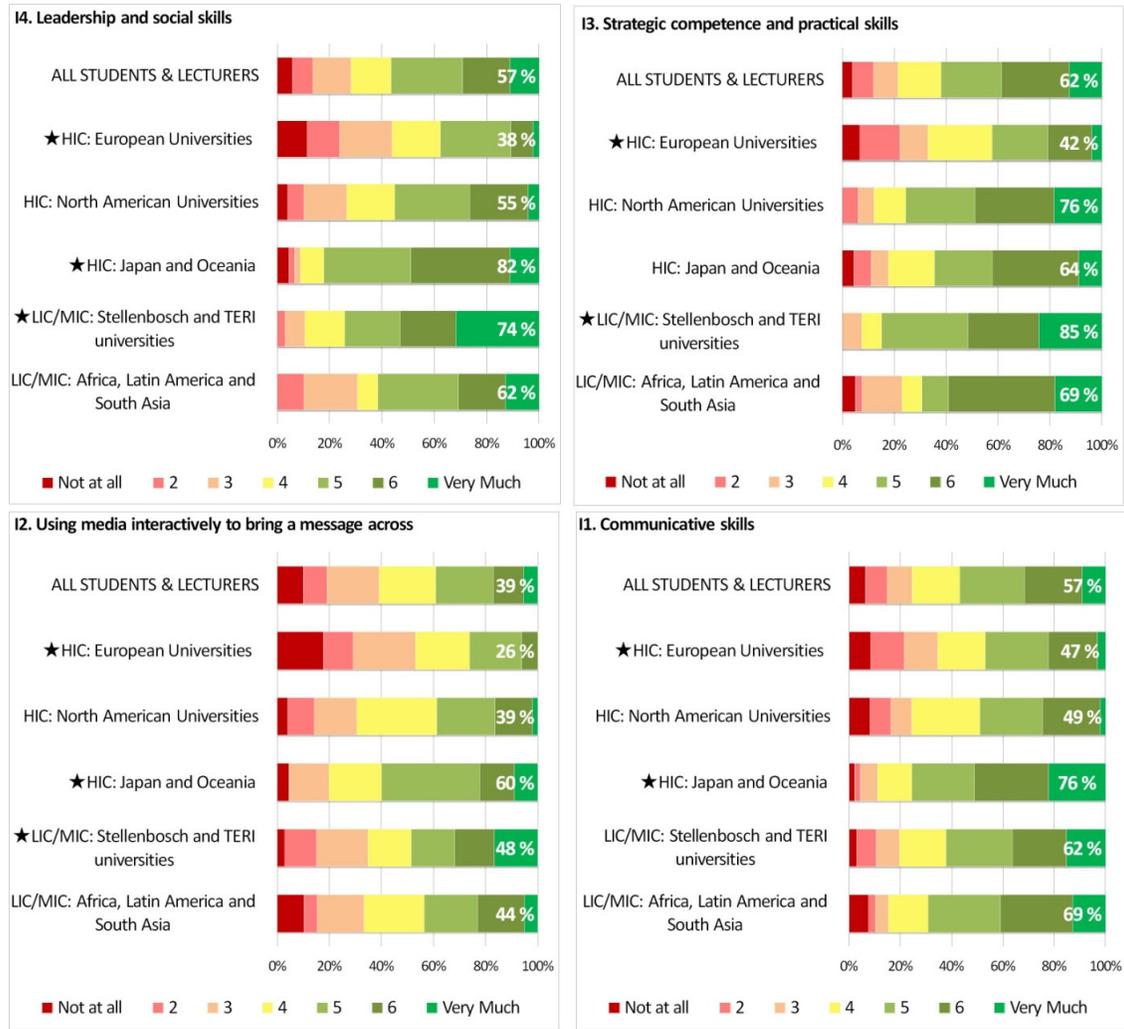


Figure 4-10: Extent to which the 'Interact' competencies are being taught in the five programme groups according to students and lecturers (n = 325). The percentages show the share of the three highest scales (5, 6 and 7 'Very Much'). The ★-symbol indicates a significant difference between this group's (with the symbol in front) score and the 'All' group's score (Mann-Whitney U: $\alpha = 0.05$).

None of the 'Interact' competencies has a high representation in all groups of programmes. The scores vary but three groups of programmes clearly stand out: HIC1 Europe, HIC3 Japan and Oceania and LIC/MIC1 Stellenbosch and TERI.

Europe has on all four competencies the lowest score: on all four a significantly are lower than average. The programmes in Japan and Oceania appear to spend considerable attention to the 'Interact' competencies, all scores are significantly higher than average except the score I3 which is still above average. The scores of Stellenbosch and TERI are significantly higher than average for all competencies except I1, which also is still above average. The LIC/MIC2 programmes' scores are (but not significantly) above average on all competences.

The scores given by students and lecturers in North America to their programmes are variable for this cluster, most notable is the high score on I3 'Strategic competence. All 'Interact' competencies, thus 'leadership and social skills', using the media to bring a message across', 'strategic competence', and 'communicative skills' all score notable lower in the European and the North American programmes than in HIC3 and the LIC/MIC groups. Further analysis revealed that the representation of the competencies in the programmes in North

America only on half of the occasions is significantly lower than HIC3, LIC/MIC1 and LIC/MIC2. The representation of the competencies in the European programmes, however, is significantly *lower* than HIC3 Japan and Ocean, LIC/MIC1 and LIC/MIC2 in 'Interact' *all* competences. Except from I1 'Communicative skills', all 'Interact' also score *significantly* lower than the scores of the North American programmes.

THE 'BE' CLUSTER

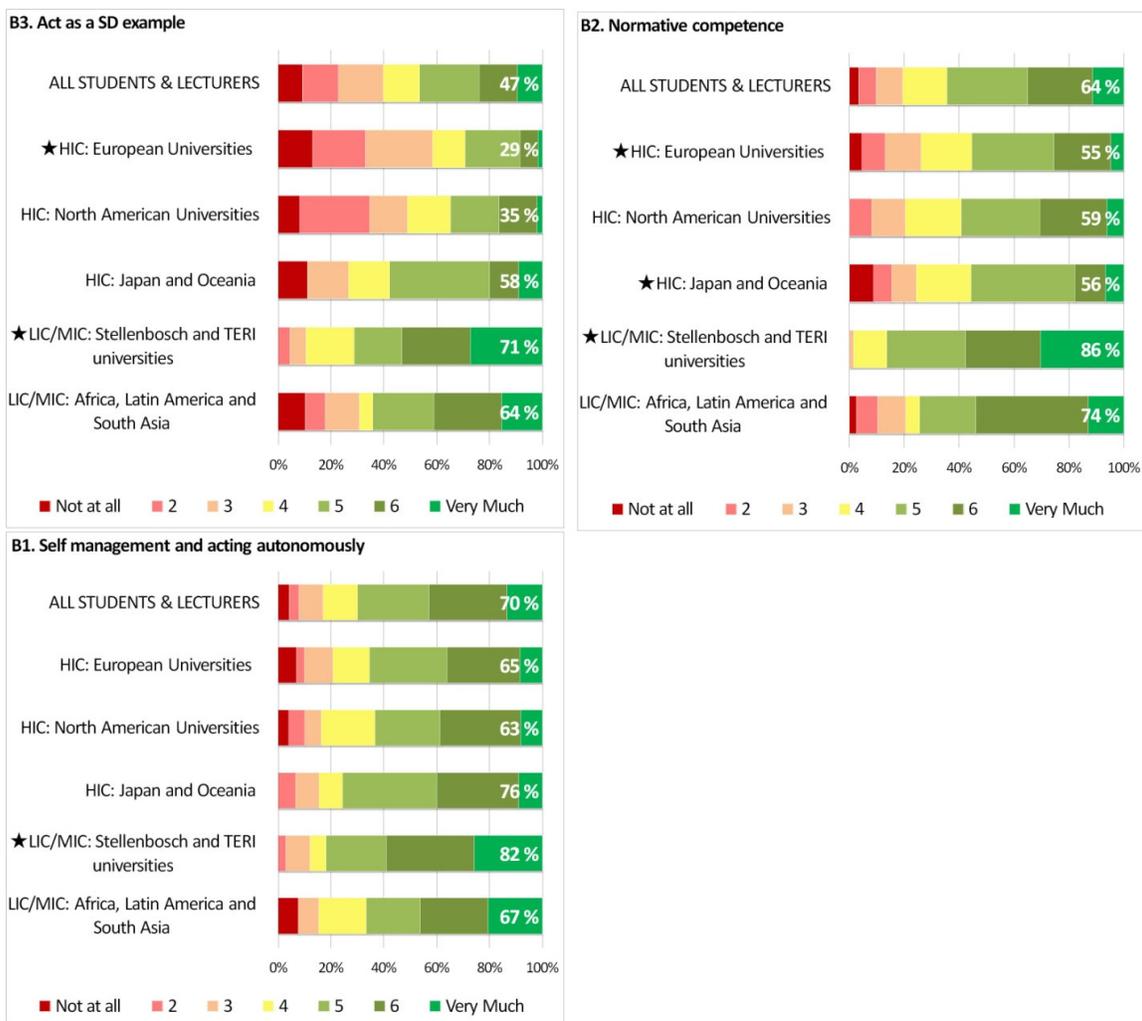


Figure 4-11: Extent to which the 'Be' competencies are being taught in the five programme groups according to students and lecturers (n = 325). The percentages show the share of the three highest scales (5, 6 and 7 'Very Much'). The ★-symbol indicates a significant difference between this group's (with the symbol in front) score and the 'All' group's score (Mann-Whitney U, $\alpha = 0.05$).

High level competence B3 'Act as a SD example' scores relatively low on average. The differences between the groups are high. HIC1 Europe's score is significantly *lower* than average while B3 is significantly *higher* represented than average in LIC/MIC1 Stellenbosch and TERI. A more general conclusion can also be drawn: the extent to which B3 'Act as a SD example' is taught in the LIC/MIC programmes and Japan and Oceania is significantly *higher* than the extent to which the same competence is taught in the European and North American programmes (Mann-Whitney U $\alpha = 0.05$).

B2 'Normative competence' is clearly less present in all three HIC teaching programmes than the LIC/MIC programmes. The scores of HIC1 Europe and HIC3 Japan and Oceania are significantly *lower* than the scores of

LIC/MIC1 and LIC/MIC2 (Mann-Whitney U $\alpha = 0.05$). The score of HIC2 North America is significantly *lower* than LIC/MIC2 but not than LIC/MIC1 (0.081, Mann-Whitney U $\alpha = 0.05$).

Lower level competence B1 'Self management and acting autonomously' is the best represented 'Be' competence in the HIC groups and second best represented competence in the LIC/MIC groups. Compared to the other programme groups, the B1 competence is the least taught in Europe and North America followed by LIC/MIC3. B1 is represented the best in the programmes of Stellenbosch and TERI, significantly *higher* than average.

WRAP UP OF ABOVE

Competences K4 'Analyzing, crafting and evaluating future scenarios', K3 'Systems-thinking and analytical capacity' and K2 'Professional knowledge' are very well represented in all participating programmes. B1 'Self management and acting autonomously' is also well represented in all groups albeit the scores on this competence are slightly lower. The competence that is represented the least in all groups of programmes is I2 'Using the media interactively to bring a message across'.

Europe and North America

The responses from the Europe universities are fairly similar to the North American responses:

Know: A high representation of the 'Know' cluster and similar results on the

Be: cluster: Low representation of B3 'Act as an SD example', Mixed representation of B2 'Normative competence' and a relatively high representation of B1 'Self management and acting autonomously'.

Interact: I4 'Leadership and social skills' scores appears to receive little teaching time in Europe or the teaching time is not recognized as such. The results for I4 are better, but still mixed, in North America. The second difference between the two groups are the results of I3 'Strategic competence and practical skills': a mixed representation in Europe against a high representation in North America.

Japan Oceania

Know: The 'Know' cluster is very well represented in the Japan and Oceania group.

Be: The 'Be' cluster shows highly variable scores with mixed results on B3 and B2 and high results on B1 'Self management and acting autonomously'.

Interact: The 'Interact' cluster is also well represented with most notably an unusual high score on I4 'Leadership and social skills' and equally high scores on I3 'Strategic competence and practical skills' and I1 'Communicative skills'. Only I2 received variable scores.

LIC MIC1 and LIC MIC2

Many competencies are very well presented in the two LIC/MIC groups.

Know and Be: The 'Know' and 'Be' clusters score high in the Stellenbosch and TERI programmes and the programmes in LIC/MIC2.

Interact: Of the 'Interact' group are I3 'Strategic competence and practical skills' and I1 'Communicative skills' very well represented. I4 'Leadership and social skills' is very well represented in the Stellenbosch and TERI programmes, a result that is only matched by the Japan and Oceania group.

4.3.3.1 THE VIEWS IN THE DIFFERENT PROGRAMME GROUPS ON THE MOST IMPORTANT COMPETENCIES FOR A SUSTAINABILITY PROFESSIONAL

THE 'KNOW' CLUSTER

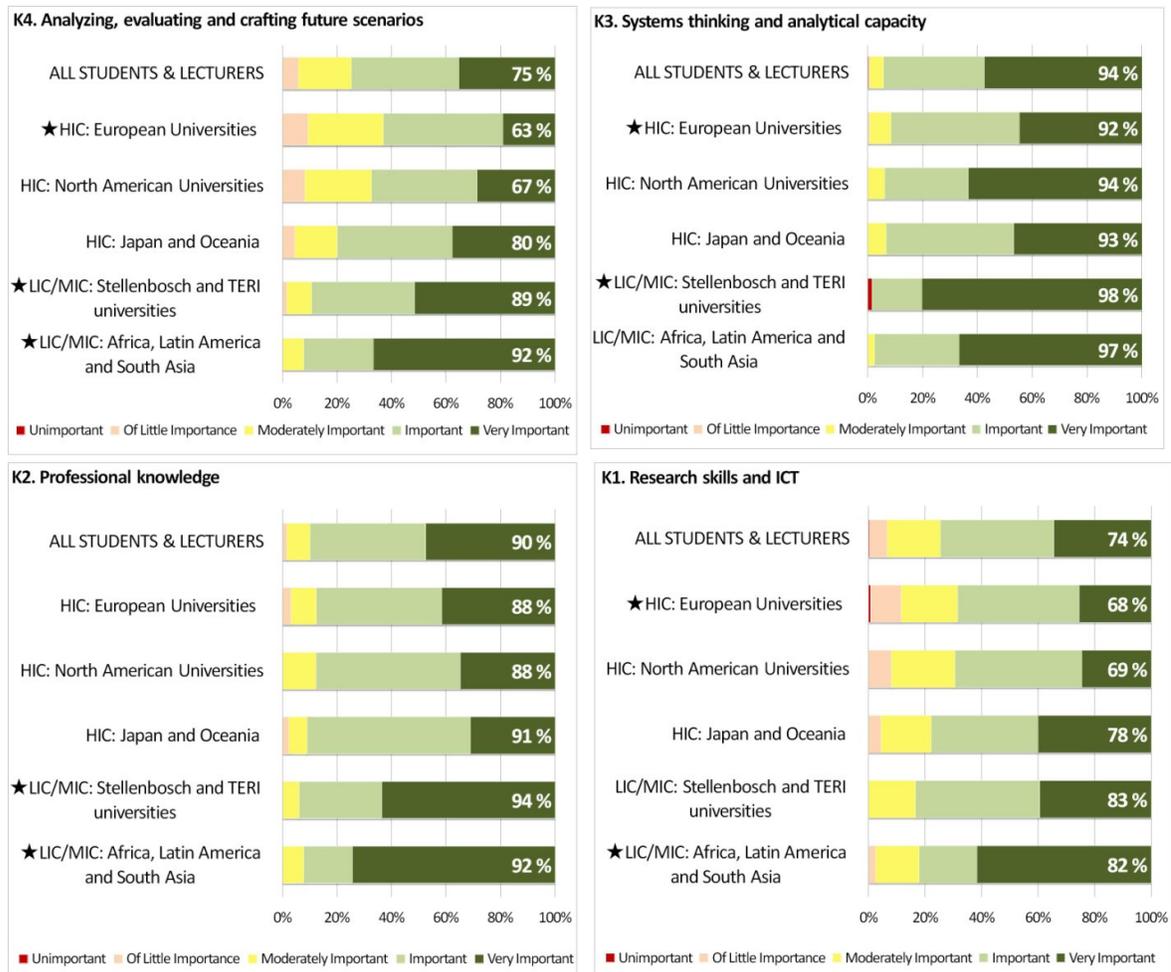


Figure 4-12: Representation of the 'Know' competencies in the different programme groups. The percentages show the share of the two highest scales ('Important and 'Very important'). The ★-symbol indicates a significant difference between this group's (with the symbol in front) score and the 'All' group's score (Mann-Whitney U: $\alpha = 0.05$).

K4 is considered significantly less important for future change agents by students and lecturers in European and North American programmes than by their fellow students and lecturers in the LIC/MIC1 and LIC/MIC2 programmes.

K3 and K2 are among the six competencies that are considered the most important by the students and lecturers. Virtually no student or lecturer filled in that these competencies are of little or no importance.

And even here is the importance to the respondents in the HIC1 and HIC2 give to the two competencies significantly lower than the importance according LIC/MIC1 and LIC/MIC2, except for the difference in scores between HIC2 and LIC/MIC2 for K3 (0,66, Mann-Whitney U $\alpha = 0.05$).

The scores that the European respondents gave on the importance of all the four 'Know' competencies, K4,K3,K2 and K1, are significantly *lower* than those given by the respondents of the LIC/MIC1 and LIC/MIC2 countries (Mann-Whitney U $\alpha = 0.05$). The score of Japan and Oceania lies in between these two opposites. This may suggest that the 'Know' competencies, that deal with working with future scenarios, analytical capacities, professional knowledge and research skills are considered significantly less important by the students and lecturers in European and North American programmes than by the students and lecturers in the developing countries.

THE 'INTERACT' CLUSTER

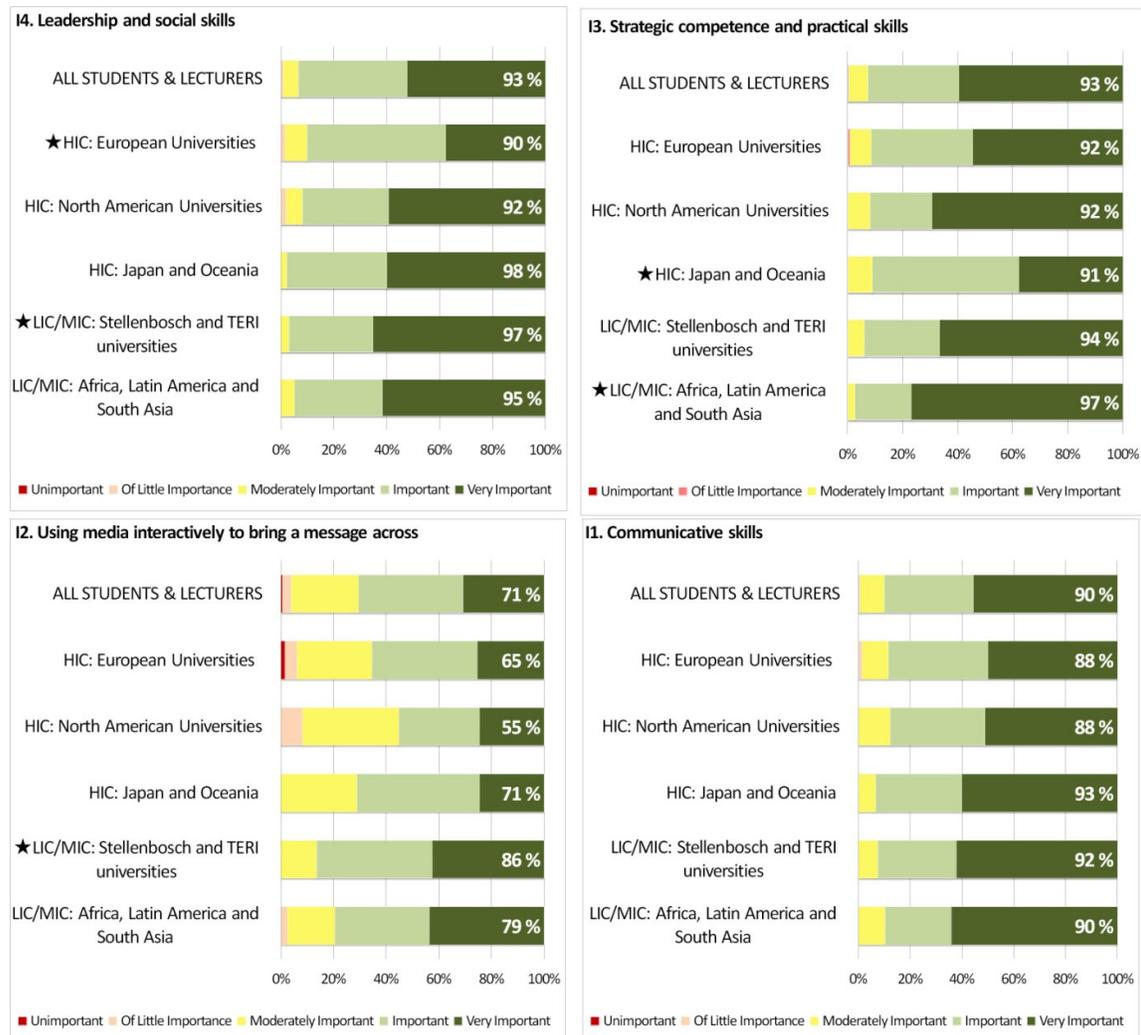


Figure 4-13: Representation of the 'Interact' competencies in the different programme groups. The percentages show the share of the two highest scales ('Important and Very important'). The ★-symbol indicates a significant difference between this group's (with the symbol in front) score and the 'All' group's score (Mann-Whitney U: $\alpha = 0.05$).

I4 'Leadership and social skills', I3 'Strategic competence and practical skills' and I1 'Communicative skills' are considered unanimously to be highly important for a sustainability professional who wants to accelerate change towards a sustainable future. The difference that could be seen in the 'Know' cluster between the HIC1, HIC2 and LIC/MIC2 and LIC/MIC2 is present in this cluster too but is only significant in competence I2.

I2 'Using the media interactively to bring a message across on average the lowest scoring competence in the whole KIB framework. After splitting the average into the five programme groups, however, it becomes clear

that the competence is only considered relatively unimportant by respondents of the European and North American programmes and not by the respondents in the other groups.

THE 'BE' CLUSTER

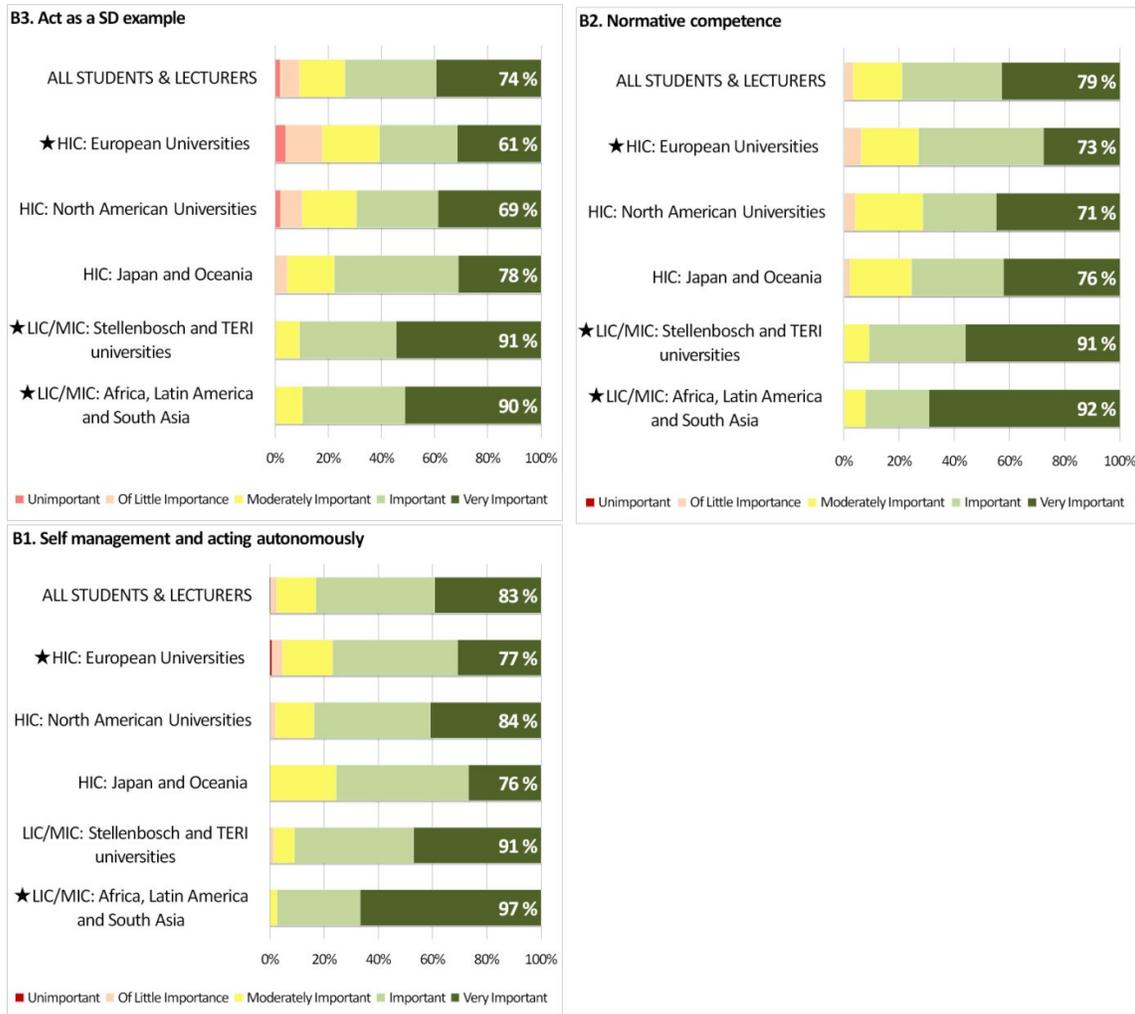


Figure 4-14: Representation of the 'Be' competencies in the different programme groups. The percentages show the share of the two highest scales ('Important' and 'Very important'). The ★-symbol indicates a significant difference between this group's (with the symbol in front) score and the 'All' group's score (Mann-Whitney U: $\alpha = 0.05$).

The importance that respondents in the LIC/MIC groups ascribe to the three 'Be' competencies is again obviously higher than how the important the HIC groups consider the competences. This difference in scores between the HIC and LIC/MIC groups is significant in B3 'Act as an SD example' and B2 'Normative competence' and between HIC1 Europe and the LIC/MIC groups for B1 'Self management and acting autonomously'. The respondents in the European programmes (significantly lower than the average on all three competencies)

Table 4-7 summarizes the representation of the competencies in the different programme groups and the importance that is given to these competencies in the different programme groups. Caution should be taken when interpreting results as both percentages have a (totally) different meaning based on two different scales.

Table 4-7: Representation of the competencies in the programmes versus the importance that is given to the competencies in the different programme groups. Differences smaller than 20% are given a green color, larger differences an orange color.

Programme Comptencies	HIC: Europe		HIC: North America		HIC: Japan and Oceania		LIC/MIC: Stellenbosch and TERI		LIC/MIC: Africa, Latin America, South Asia	
	Current	Importance	Current	Importance	Current	Importance	Current	Importance	Current	Importance
K4 Working with Future scenarios	68%	63%	86%	67%	71%	80%	77%	89%	69%	92%
K3 Systems-thinking, Analytical cap.	80%	92%	78%	94%	78%	93%	83%	98%	74%	97%
K2 Professional Knowledge	65%	88%	76%	88%	73%	91%	89%	94%	79%	94%
K1 Research and ICT skills	62%	68%	59%	69%	69%	78%	53%	83%	82%	82%
I4 Leadership and social skills	38%	90%	55%	92%	82%	98%	74%	97%	62%	95%
I3 Strategic competence	42%	92%	76%	92%	64%	91%	85%	94%	69%	97%
I2 Ability to bring a message across	26%	65%	39%	55%	60%	71%	48%	86%	44%	73%
I1 Communicative skills	47%	88%	49%	88%	76%	93%	62%	92%	69%	90%
B3 Act as SD example	29%	61%	35%	69%	58%	78%	71%	91%	64%	90%
B2 Normative Competence	55%	73%	59%	71%	56%	76%	86%	91%	74%	92%
B1 Self Management	65%	77%	63%	84%	76%	76%	82%	91%	67%	97%

4.3.3.2 JOB EXPECTATIONS FOR STUDENTS PER GROUP ACCORDING TO THE RESPONDENTS IN THE DIFFERENT PROGRAMME GROUPS

Further analysis why students consider specific competencies important for their future career as sustainability professional could include the analysis of for *which* jobs the students want to obtain these competencies. Comparing the future job perspectives of the different programmes groups, unfortunately, did not fit in the time-span of the study. Further analysis of the future job perspectives of the different programme groups is not part of this study but is an interesting subject for further study especially to investigate whether students *do* couple the competencies they want to obtain in their master's programme to their preferred future job.

Table 4.8 shows the kind of job students and lecturers of the different programme groups expect that the students will do in 10 years. Some interesting observations can be made:

The low number of students (which, after all, dominate the results, being more numerous than the lecturers) considers themselves a potential teacher or academic or expects to work outside the sustainability field.

The significantly high representation of 'Having my own company' and 'Greening companies/CSR' in the expected jobs for the students of the Stellenbosch and TERI programmes compared to the other groups.

The significantly high representation of 'Working at a NGO' in the expected jobs for the students of the North American programmes. And the variable place this future job has in the other groups.

'Greening companies and CSR' very low (significantly below average) in the expected jobs for the students of the North American and LIC/MIC2 programmes.

Table 4-8: Career perspectives according to the respondents of the different programme groups. For each programme group the future jobs are ranked according to the score they achieved. The ★-symbol indicates a significant difference between this group's (with the symbol in front) score and the 'All' group's score (the average) (Student-T Test: $\alpha = 0.05$).

All Students and Lecturers	HIC: European Universities	HIC: North American Universities	HIC: Japan and Oceania	LIC/MIC: Stellenbosch and TERI universities	LIC/MIC: Africa, Latin America and South Asia
1.Consultancy 18.7 (14.0)	1.Consultancy 19.9 (15.0)	1. NGO ★27.8 (23.0)	1. Policy maker 22.0 (22.8)	1. Own company ★20.5 (21.4)	1.Consultancy 19.5 (12.1)
2.Greening companies/CSR 14.5 (14.3)	2.NGO 18.6 (16.8)	2. Consultancy 20.6 (14.5)	2.Lecturer ★15.8 (18.0)	2. Greening companies/CSR 17.5 (15.3)	2.Policy maker 18.8 (12.5)
3.Policy maker 15.7 (17.1)	3. Greening companies/CSR 17.0 (14.1)	3 .Policy maker 15.0 (18.7)	3.Consultancy ★14.4 (13.9)	3.Consultancy 17.5 (12.4)	3. NGO 17.1 (16.4)
4.Scientist 7.2 (11.5)	4.Policy maker ★12.4 (14.8)	4.Own company 10.8 (13.3)	4. Greening companies/CSR 13.4 (17.6)	4.Policy maker 16.8 (17.0)	4.Own company 11.8 (17.6)
5.NGO 17.6 (17.2)	5.Own company 10.8 (15.7)	5. Greening companies/CSR ★8.8 (11.0)	5. Scientist 8.8 (13.3)	5.NGO ★12.4 (11.9)	5. Scientist 10.3 (16.6)
7.Lecturer 8.5 (12.1)	6. Scientist 8.5 (10.6)	6.Lecturer 8.7 (11.5)	6.NGO ★11.2 (11.9)	6.Lecturer 9.3 (11.3)	6. Greening companies/CSR ★9.5 (8.7)
8.Own company 12.3 (16.8)	7.Lecturer ★5.9 (10.0)	7. Scientist 4.4 (9.0)	7. Own company ★7.4 (10.1)	7. Scientist ★3.8 (8.5)	7.Lecturer 7.8 (9.1)
9. Job outside SD field 5.4	8. Job outside SD field				

(10.0)	7.0 (12.5)	3.9 (6.0)	7.1 (10.5)	★ 2.1 (4.9)	5.2 (8.8)
100	100	100	100	100	100

4.4 SUSTAINABILITY ISSUES

Research question: *On which sustainability issues is being taught (and should ideally be taught) in the sustainable development master's programmes?*

4.4.1 OVERVIEW OF THE REPRESENTATION OF THE DIFFERENT SUSTAINABILITY ISSUES IN THE CONTENT OF THE PROGRAMMES

The answer categories were six themes of sustainability issues that were also used for the outline of the Brundtland rapport in 1987 (WCED, 1987): Population Growth, Ecosystems and Biodiversity Loss, Poverty and Food Security, Energy System and Climate Change, Inefficient Production and Consumption, Urban Sprawl and Unhealthy Megacities.

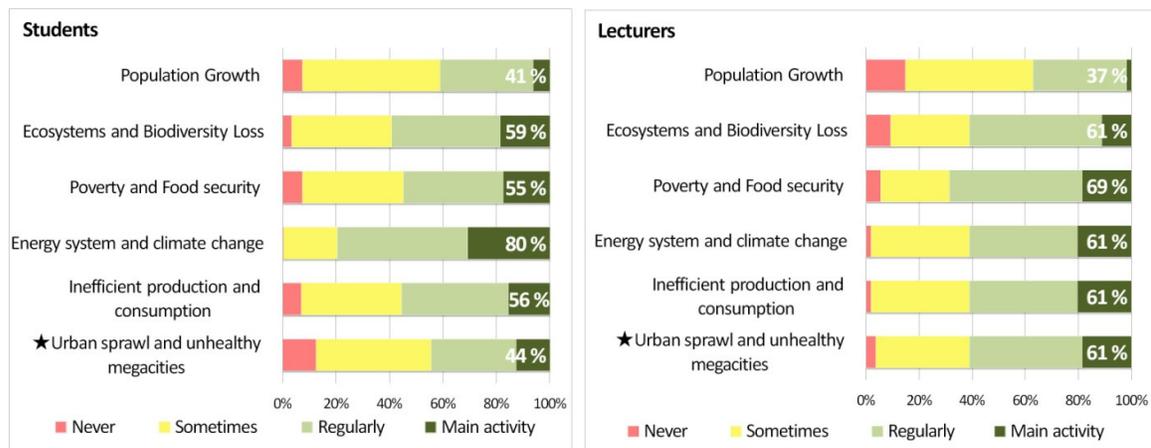


Figure 4-15: Time spend on the six themes of sustainability issues in all programmes combined according to students (n = 270) and lecturers (n=54). The ★-symbol indicates a significant difference between the rating by students and by lecturers on that certain topic (Mann-Whitney U: $\alpha = 0.05$).

According to the students, the most attention in their programmes is given to the **Energy system and Climate change**. Followed (at a respectable distance) by **Ecosystems and Biodiversity loss**, **Inefficient production and Consumption** and **Poverty and food security**. **Population growth** and **Urban sprawl and unhealthy megacities** receive the least attention in the programmes.

The lecturers' views on which sustainability issues are being taught in the programmes are different. **Poverty and food security** is the theme that is given the most attention according to the lecturers. Similar to the students' views, the least teaching time is given to **Population growth**. The remaining four issue clusters received equal scores and is regularly being taught on. The lecturers' view on the representation of **Urban sprawl and unhealthy megacities** in the master's programmes is significantly *higher* than the students' view on the representation of this theme.

4.4.2 REPRESENTATION OF THE SUSTAINABILITY ISSUES IN THE CONTENT OF THE DIFFERENT PROGRAMME GROUPS

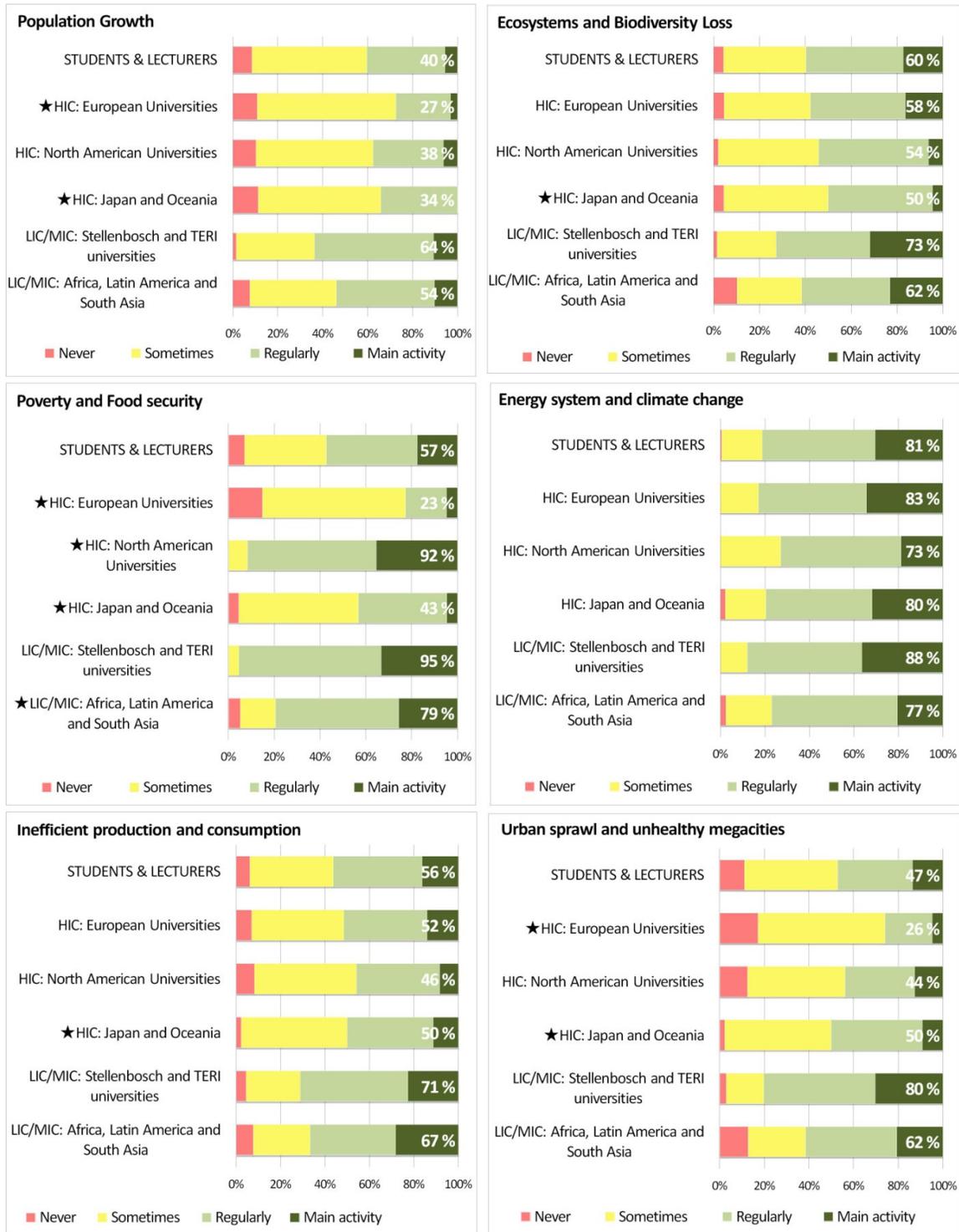


Figure 4-16: Representation of the sustainability issues in the content of the different programme groups. The percentages show the share of the two highest scales ('Regularly' and 'Main activity'). The ★-symbol indicates a significant difference between this group's (with the symbol in front) score and the 'All' group's score (the average) (Mann-Whitney U: $\alpha =$

Looking at the representations of the six themes of sustainability issues one conclusion is fair to state: all sustainability themes are given at least some attention in all programmes (few people filled in the ‘never’ category) but the attention that is given to some themes varies among the groups.

Population growth is the least taught theme on average. However, splitting the results in the five programme groups reveals a clear distinction between the representation in the HIC and the LIC/MIC groups. The theme is being taught about considerably less in the HIC programmes in comparison to the two LIC/MIC groups. The issue significantly less taught in Europe and Japan and Oceania than in the two LIC/MIC groups (Mann-Whitney U $\alpha = 0.05$). This does not hold for HIC2 North America which score does not differ significantly with that of LIC/MIC2 Africa, Latin America and South Asia ($\alpha = 0.145$ Mann-Whitney U $\alpha = 0.05$).

In most groups around 60% of the respondents in all five groups filled in that **Ecosystems and Biodiversity loss** is given attention on a regular basis or as a main activity in their programmes. The theme appears to be taught significantly less in Japan and Oceania and more often than average in the Stellenbosch and TERI programmes.

Poverty and food security is given significantly less attention in the programmes in Europe and Japan and Oceania compared to the programmes in North America and the two LIC/MIC groups.

Energy and climate change is very well represented in all programme groups. The theme is given the least attention in the North American programmes compared to the other groups.

The results on **Inefficient production and consumption** show high similarities with the ecosystems and biodiversity theme: around half of the respondents in the HIC groups filled in the theme is given attention on a regular basis or as a main activity in their programmes. This percentage is around 70% in the LIC/MIC groups.

The only programmes in which **Urban sprawl and unhealthy megacities** clearly is a main theme are Stellenbosch and TERI. The least attention is given in the European programmes (significantly *less* than average). The theme is given slightly more attention in the LIC/MIC2 programmes than in HIC2 and HIC3.

When the lecturers were asked upon different factors that explain how and what is being taught in their sustainable development master's programmes, the most important factor appears to be the **available expertise of the lecturers** followed by the lecturers their view on the **dominant global sustainability issues** and their view on the **dominant local sustainability issues** (paragraph 4.6). In the next paragraphs will be analyzed whether the differences in teaching time that is spent on the different sustainability themes can be explained by which national and worldwide sustainability issues are considered important in the programme groups.

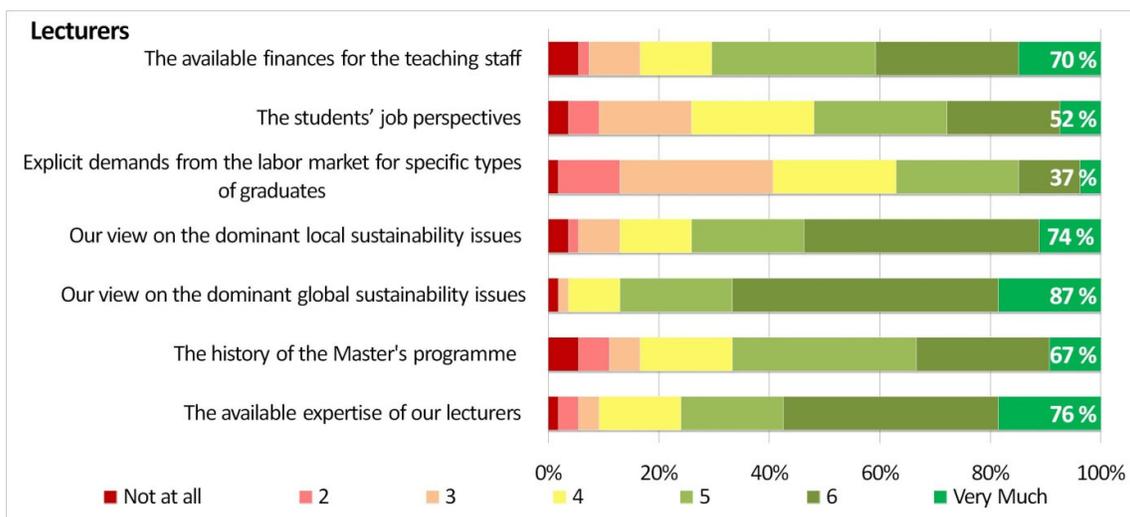


Figure 4-17: Lecturer response on five possible factors that could explain the way sustainable development is being taught in the Sustainable development Master's Programmes.

4.4.2.1 THE RESPONDENTS' VIEW ON THE MOST IMPORTANT GLOBAL SUSTAINABILITY ISSUES

Few differences were found in the views of the different programme groups. The following differences are significant (Student's T-Test, $\alpha = 0.05$):

- ❖ **Population growth** significantly *higher* than average in the European programmes.
- ❖ **Poverty and food security** significantly *lower* than average in the European programmes but significantly *higher* in the North American programmes and Japan and Oceania programmes.
- ❖ **Inefficient production and consumption** significantly *higher* than average in the Japan and Ocean programmes.

The lecturers' views on the most important *worldwide* sustainability issues is the second-most important factor behind the way sustainable development is taught. Given their low numbers the lecturers cannot be analyzed using the five programme groups. The low variety in the results on this variable between the programme groups if both students and lecturers are included (Figure 4-18) does not allow for a fruitful comparison between the issues that are taught in the programmes and the issues are considered important, either.

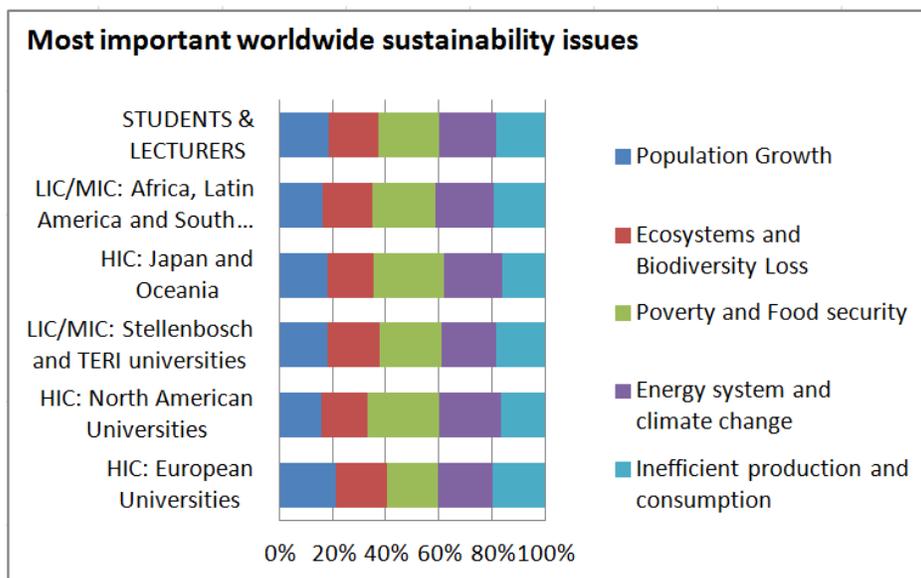


Figure 4-18: Most important worldwide sustainability issues according to the students and lecturers of the different programme groups, based on the mean scores. The respondents had to divide 100 points over the five issue clusters.

4.4.2.2 THE RESPONDENTS' VIEW ON THE MOST IMPORTANT NATIONAL SUSTAINABILITY ISSUES

The third-most important factor behind the way sustainable development is being taught is the lecturers' view on the *local* sustainability issues.

Not all students and lecturers study or work in their own country, consequently, the sustainability issues of the country of their programme are therefore not necessarily the same as the national sustainability issues in their country of birth. In this study, the relatively low number of students and lecturers in the programmes that studies or works abroad or studies in a different continent than the continent of his country of birth⁵ makes it possible, to use what the respondents of the programme groups indicate as the '*important sustainability issues in my country of birth*' as the local sustainability issues of that programme group.

Table 4-9 shows what the students and lecturers of the different programme groups pointed out as the most important national sustainability issues in their countries of birth.

Table 4-9: Most important sustainability issues in the countries of birth of the students and lecturers of the different programme groups. The ★-symbol indicates a significant difference between that group's score and the 'All' group's score (the average) (Student-T Test: $\alpha = 0.05$). The Standard Deviation is given in brackets.

All Students and Lecturers	HIC: European Universities (%foreign students among response:	HIC: North American Universities (%foreign students among response:	HIC: Japan and Oceania (%foreign students among response:	LIC/MIC: Stellenbosch and TERI universities (%foreign students among response:	LIC/MIC: Africa, Latin America and South Asia (%foreign students among response:
1. Energy system & climate change 28.7 (13.9)	1. Energy system & climate change ★ 34.4 (12.8)	1. Energy system & climate change ★ 33.5 (16.9)	1. Energy system & climate change 25.0 (11.8)	1. Poverty & Food security ★ 30.7 (17.3)	1. Poverty & Food security ★ 24.8 (11.4)
2. Inefficient production & consumption 24.8 (13.0)	2. Inefficient production & consumption ★ 30.8 (11.8)	2. Inefficient production & consumption 28.2 (12.8)	2. Poverty & Food security 20.5 (15.4)	2. Energy system & climate change ★ 19.3 (9.5)	2. Energy system & climate change ★ 23.5 (9.7)
3. Ecosystems & Biodiversity 18.7 (9.4)	3. Ecosystems & Biodiversity 20.6 (9.6)	3. Poverty & Food security 18.6 (14.4)	3. Ecosystems & Biodiversity 18.7 (10.1)	3. Ecosystems & Biodiversity 17.6 (9.1)	3. Inefficient production & consumption ★ 21.2 (9.8)
4. Poverty & Food security 18.0 (15.9)	4. Poverty & Food security ★ 8.4 (10.3)	4. Ecosystems & Biodiversity ★ 14.9 (8.4)	4. Inefficient production & consumption ★ 18.1 (11.1)	4. Inefficient production & consumption ★ 17.3 (11.7)	4. Ecosystems & Biodiversity 19.3 (8.0)
5. Population Growth 9.8 (12.3)	5. Population Growth ★ 5.9 (8.6)	5. Population Growth ★ 4.8 (6.9)	5. Population Growth ★ 17.7 (18.9)	5. Population Growth ★ 15.2 (12.6)	5. Population Growth 11.1 (10.1)
100	100	100	100	100	100

⁵ Percentages of participating students and lecturers from another country: **HIC1:44%, HIC2:19%, HIC3:68%, LIC/MIC1:36%, LIC/MIC2:20%**

Percentages of participating students and lecturers from another world region: **HIC1:20%, HIC2:13%, HIC3:3%, LIC/MIC1:9%, LIC/MIC2:3%**

Paragraph 4.4.2: Population growth: being taught significantly more in LIC/MIC than in HIC

Considered importance *does rhyme* with representation in the programmes of this group: Population growth is considered the least important national sustainability issue in the different programmes in Europe and North America. The issue is considered significantly more important in the programmes in Japan and Oceania and the Stellenbosch and TERI programmes.

Paragraph 4.4.2: Ecosystems and biodiversity: being taught significantly less than average in Japan and Oceania

Considered importance *does not rhyme* with representation in the programmes of this group: the small representation in the master's programmes in Japan and Oceania cannot be explained by the extent to which the issue is considered important by the respondents in these programmes. The low importance of the issue in North America also does not match with the extent the issue is given attention in the programmes in this region.

Paragraph 4.4.2: Poverty and food security: being taught significantly less in the European and Japan and Oceania programmes and significantly more in the North American and LIC/MIC2 programmes

Considered importance *does rhyme* with representation in the programmes of this group: indeed considered the least important issue in Europe. Contradictory, considered a relatively important national issue in Japan and Oceania.

Paragraph 4.4.2: Energy system and climate change: well represented in all groups

Considered significantly more important in Europe and North America than LIC/MIC

Paragraph 4.4.2: Inefficient production and consumption: being taught more in LIC/MIC than in HIC

Considered importance *does not rhyme* with representation in the programmes of this group: Above average in Europe and North America.

Paragraph 4.4.2: Urban sprawl and unhealthy megacities: clearly a main theme in Stellenbosch and TERI.

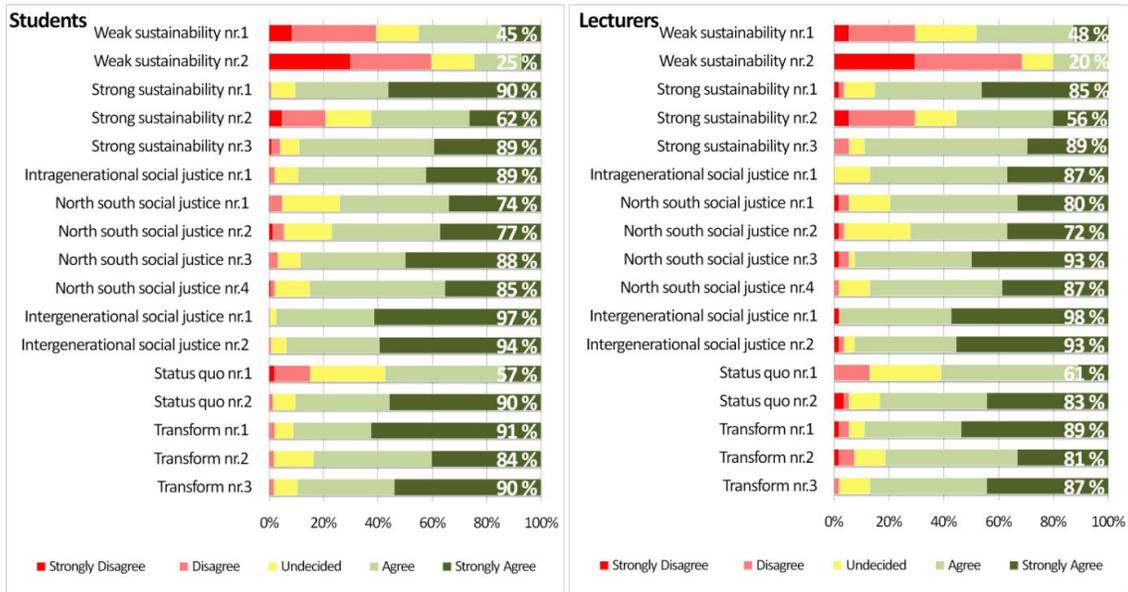
Considered importance *does not* clearly rhyme with representation in the programmes of this group The least attention is given in the European programmes (significantly *less* than average). The theme is given slightly more attention in the LIC/MIC2 programmes than in HIC2 and HIC3.

To conclude: where a programme is situated does not imply that it also focuses its teaching on that country. HIC programmes do not necessarily teach more about inefficient production and consumption and North American programmes appear to focus strongly focus on the third world and sustainability issues of developing and upcoming nations. This suggests the programmes are very international in focus: teaching time is spent on sustainability issues that are not very pronounced inside the national borders.

4.5 VIEWS ON SUSTAINABLE DEVELOPMENT

4.5.1 OVERVIEWS OF THE STUDENTS' AND LECTURERS' VIEWS ON SUSTAINABLE DEVELOPMENT

Table 4-10: Students' and lecturers' views on sustainable development. No significant differences between the views of students and lecturers were found (Mann-Whitney U: $\alpha = 0.05$).



High consensus is found between the views of students and lecturers on the different citations on sustainable development. All aspects of social justice (North south, intra- and intergenerational social justice) and the 'transform' points of view receive strong support from both the students and lecturers. No significant differences were found between the students' and lecturers' views.

Mixed views from students and lecturers on weak sustainability 1: Sustainable development includes *no conflict between the growth of the global market and environmental stability*; 'we can have an open vigorous and healthy trading system and achieve sustainable development' (WBCSD, 1998;p.6).

Highly negative views from students and lecturers on weak sustainability 2: Sustainable development includes that *natural and manufactured capital are in principle interchangeable*, with new technology mankind is able to fill human produced gaps in the natural world. In time the world can, in effect, get along without natural resources, *so exhaustion is just an event* (Solow, 1974;p48).

Mixed views from students and lecturers on Strong sustainability 2: Sustainable development requires a *substantial reduction in living standards of the rich* and distribution of wealth more fairly in a world that *drastically reduces consumption and reduces the size of the global population* (Hopwood et al., 2005 P.40).

Mixed views from students and lecturers on Status quo 1: Sustainable development *requires that there is sufficient money to be made in it for businesses. Partnerships* between governments, businesses, environmentalists and scientists *could enable technology development* (Dryzek, 1997, p. 142; Alier, 2003; Hopwood et al., 2005 p.40)

4.5.2 VIEWS OF THE STUDENTS AND LECTURERS OF THE DIFFERENT GROUPS OF PROGRAMMES

Figure 4-19 shows highly similar results for most of the citations in all programme groups. The same patterns as in 4.5.1 can be identified. The respondents from the North American programmes, however, have the most strongly outspoken views on a few citations:

Significantly more negative score on average on Strong sustainability 2: Sustainable development requires a *substantial reduction in living standards of the rich* and distribution of wealth more fairly in a world that *drastically reduces consumption and reduces the size of the global population* (Hopwood et al., 2005 P.40).

Significantly more negative score on average on North South social justice 1: Sustainable development includes *transfrontier responsibility; geographical equity* (Haughton, 1999; p.235).

How this observation should be interpreted is not further investigated in this study, but it definitely raises some questions, especially given the focus on developing practice in developing nations of most North American of the participating programmes, given their membership of the Global Master's in Development Practice Alliance.

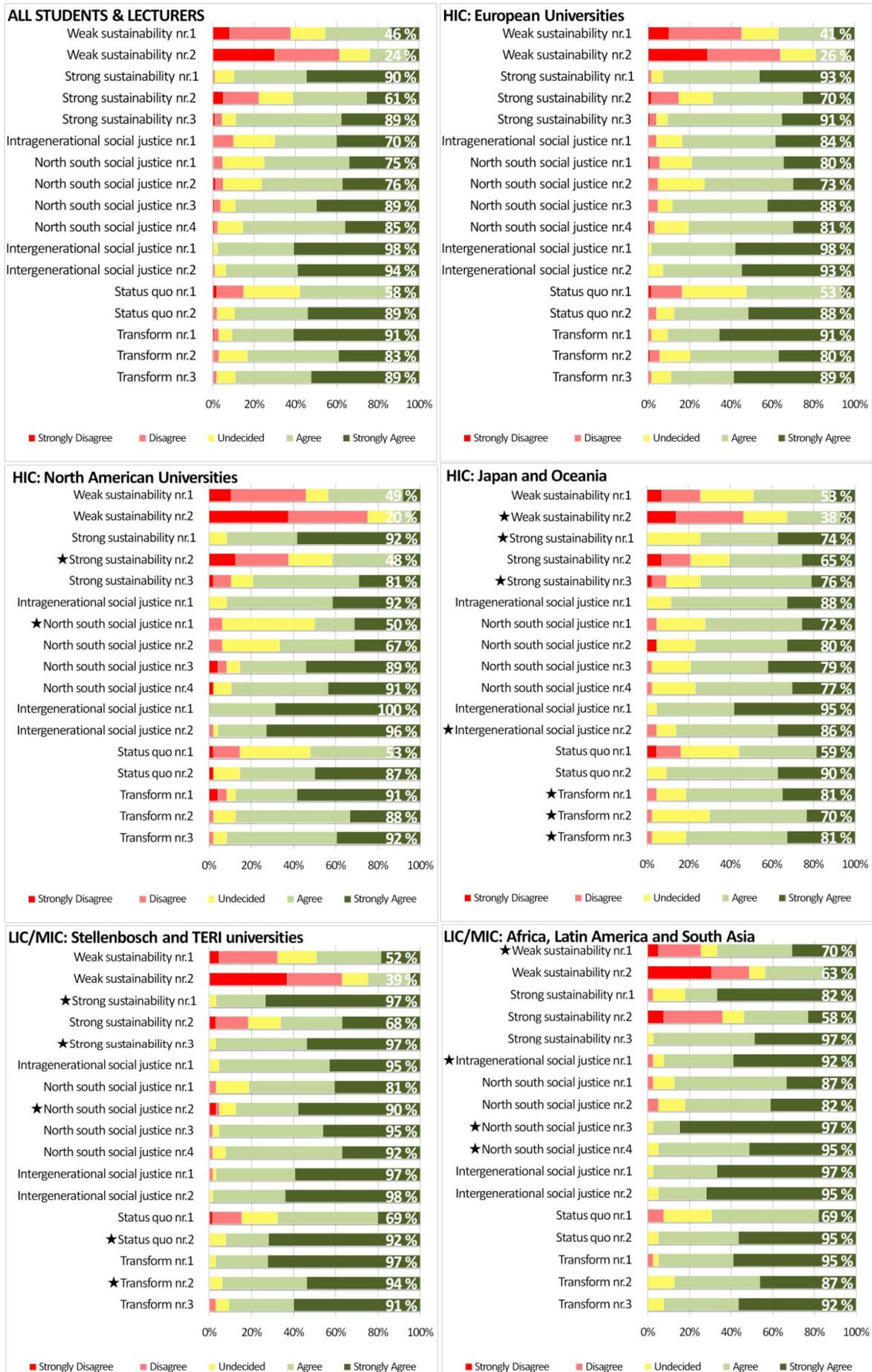


Figure 4-19: View on sustainable development of the respondents of the different programme groups. The ★-symbol indicates a significant difference between this group's score and the 'All' group's score (the average) (Mann-Whitney U: $\alpha = 0.05$).

4.6 PRACTICAL EXPLANATORY VARIABLES

Research question: *Which practical and factors regarding content influence the way sustainable development is taught in sustainable development master's programmes?*

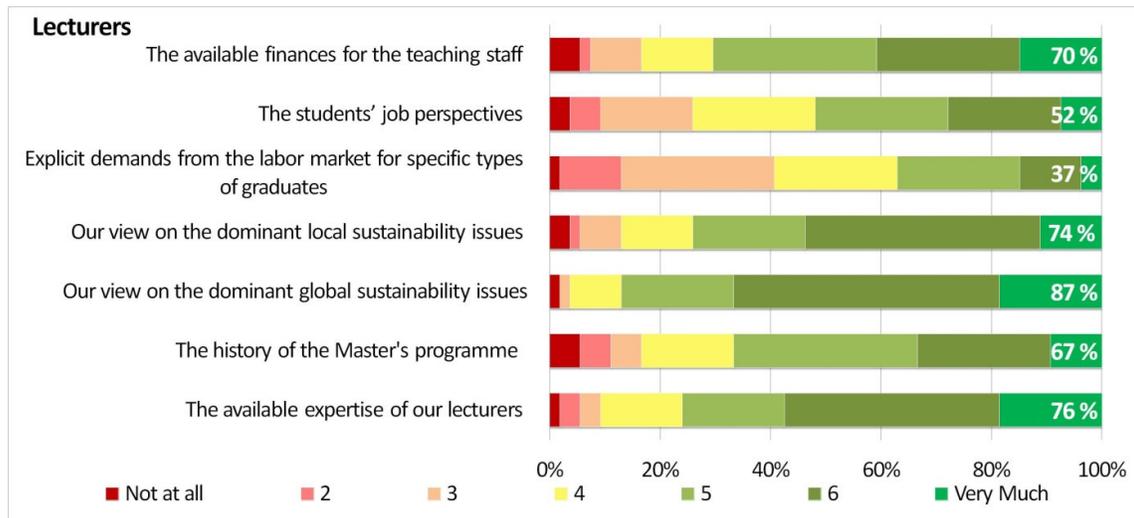


Figure 4-20: Lecturer response on five possible factors that could explain the way sustainable development is being taught in the Sustainable development Master's Programmes.

Interpreting these results the following order of relevance can be given to the different explanatory factors:

1. **The lecturers' view on global sustainability issues**
2. **The available expertise of the lecturers**
3. **The lecturers' view on local sustainability issues**
4. **The available finances for the teaching staff**
5. **The history of the Master's programme**
6. **The students' job perspectives**
7. **Explicit demands from the labor market for specific types of graduates**

What is taught in sustainability master's programmes thus appears to be highly influenced by the lecturer's view on global sustainability issues, the available expertise of the lecturers, the lecturer's view on local sustainability issues and the available finances for teaching staff. This mix of factors includes little influences from outside the university. The students' job perspectives and demands from the labor market are considered to play only a small role. Splitting up the results among the different programme groups would be highly interesting but was considered undesirable given the relatively low number of lecturers.

In this final section the conclusions that can be drawn around the main question are described and discussed: *In what way is sustainable development being taught in sustainable development master's programmes, how does this relate to the competencies sustainable development students should develop (to become future change agents) and by which factors could this relation be explained?*

EDUCATIONAL VISIONS

A motivation for this study was to test whether the strong calls by scientist for transdisciplinarity and, less pronounced, personal value development, for teaching sustainable development students, have had any impact on the teaching practice in sustainable development master's programmes.

It is very clear that conventional teaching styles (disciplinarity and the empirical vision) do not, or do no longer, dominate sustainability master's programmes. The call by different scientists around the start of the 21st century that the trend in higher education towards further specialization together with traditional teaching styles does not produce the sufficient knowledge, skills and attitudes to produce graduates capable of accelerating change towards a sustainable future, cannot be found back in the results of this study.

The sustainable development master's programmes that participated in this study definitely cannot be positioned under this 'mainstream trend towards specialization': not according to the dominant educational visions and not according to the preferred balance of educational visions. Moreover, none of the different geographical groups of programmes were dominated 'conventional modes of education'. The European sustainable development master's programmes do have a fair share of subdisciplinarity in their teaching. The other 'Mode 1' educational vision, the empirical vision has the highest representation in the programmes in Japan and Oceania, but visions, however still don't dominate in the programmes.

The call for Mode 2 ways of teaching sustainability development appears to be shared by the lecturers and students that participated in the survey: Students are interested in being taught in a way that includes all educational visions, but appear to prefer a programme that is highly interdisciplinary and transdisciplinary and also includes sizable elements of personal value development and subdisciplinarity. Lecturers also appear to move further away from the empirical vision as main element of education and indicate that programmes should, aside from being interdisciplinary and transdisciplinarity, focus more on personal value development and less on purely empirical knowledge production.

The North American Programmes show a remarkably low representation of the empirical and sub disciplinary visions and a high representation of transdisciplinarity. The four programmes in the Japan and Oceania group show a high representation of transdisciplinarity and are the only group that has a high representation of the empirical vision. Transdisciplinarity appears to be well implemented as well in the TERI and Stellenbosch programmes, as is personal value development. These programmes appear to include relatively little empirical and sub disciplinary ways of teaching. The LIC/MIC2 programmes (Africa, Latin America and South Asia) score relatively high on all visions (all above average), with notably high scores on the empirical, interdisciplinary, transdisciplinary and personal value development visions.

COMPETENCIES

What Gibbons et al. (2004) exactly meant by the '*knowledge, skills and attitudes*' students should develop to accelerate change towards a sustainable future is unclear. In this study therefore eleven competencies, important for future sustainability professionals (to be able to accelerate change towards a sustainable future) were identified from literature and brought together in the KIB framework.

Reviewing the KIB framework, students appear to consider all competencies of the framework important for their later career as a change agent. The competencies considered most important for sustainability professionals are K3 'Systems thinking and analytical-integrating capacity', K2 'Professional knowledge', I4 'Leadership and social skills', I3 'Strategic competence and practical skills' and I1 'Communicative skills'. Two competencies appear to be considered the least important: I2 'Using the media interactively to bring a message across' and B3 'Act as Sustainability example'.

The 'Know' cluster of competencies (K4-K1) appears to be the best represented cluster of competencies compared to the other KIB clusters in the different master's programmes around the world. B1 'Self management and acting autonomously' is also well represented in all groups albeit the scores on this competence are slightly lower. The Interact cluster received mixed scores, the competence that is represented the least in all groups of programmes is I2 'Using the media interactively to bring a message across'. Luckily, this is also the competence that is considered the least important. An explanation could be that students and lecturers possibly only focus on the first part of the competence 'using the media' or may think that others will do the communication.

The call by Norbert-Hodge (2000), among others, that higher sustainable development education should produce generalists which are able to look at sustainability issues from a range of disciplinary angles, cultural perspectives and spatial perspectives and different time spans (Norbert-Hodge, 2000;p.189) appears to be landed well in the participating programmes: The high interdisciplinarity and transdisciplinarity of the programmes, the diverse academic background of the students (Appendix A) and the high representation of competencies like systems-thinking competence suggest that the conditions for producing such generalists are met in many programmes.

The representation of the 'Be' competencies (+ the 'Interact competencies in European programmes), however, is remarkably low in the European and North American programmes. Should this be considered problematic? On the one hand it is: in literature these competencies are advocated as being important for future change agents and students and lecturers indicate too that they consider these competencies important and would like them to be included in education. A possibility is that the expertise is just not there: The way sustainability is taught came out to be the highly influenced by the available expertise of the lecturers. According to Sherren this is not problematic since no perfect degree is desirable because each institution should build on its own strength (Sherren, 2005;p. 104). Another relevant question is on whether students should acquire all KIB competencies in their master's programmes or are there also other opportunities for learning these competencies? Could it be possible that European students already possess (or are considered to possess) competencies that they have learned in previous education? Competencies on which students in other continents did not had the opportunity yet to learn? It would be wise for further studies to also take into account lower level education levels in a study on what competencies sustainable development students are being taught.

SUSTAINABILITY ISSUES

All sustainability themes are given at least some attention in all programmes but the representation varies among the groups. Population growth is the least taught on average. Splitting the results in the five programme groups reveals that the subject is taught notably more in programmes in developing countries than in programmes in developed countries. Ecosystems and biodiversity loss and inefficient production and consumption are both reasonably represented in all programmes. Poverty and food security is given significantly less attention in the programmes in Europe and Japan and Oceania compared to the programmes

in North America and the two LIC/MIC groups. Energy and climate change is very well represented in all programme groups. The only programmes in which Urban sprawl and unhealthy megacities is a main theme are Stellenbosch and TERI.

In which world region a programme is situated came out not to be explanatory for the sustainability issues that are being taught: the focus is not necessarily on the issues that are considered important nationally: HIC programmes do not necessarily teach more about inefficient production and consumption and LIC/MIC programmes not necessarily more about poverty and food security. Looking at which sustainability issues are being taught and which jobs students expect to full fill, North American programmes appear to focus on the third world. This observation does not rhyme, however, with the way there is looked in these programmes at North – South social justice and a more fair distribution of wealth around the world. This illustrates that the studied explanatory factors do not provide clear answers on the reasons behind the representations of educational visions, competencies and the taught sustainability issues that were found in the sustainable development master's programmes.

What and how is being taught in sustainable development master's programmes does appear to be highly influenced by the lecturer's view on global sustainability issues, the available expertise of the lecturers, the lecturer's view on local sustainability issues and the available finances for teaching staff. This mix of factors includes little influences from outside the university. The students' job perspectives and demands from the labor market are considered only to play a small role. Splitting up the lecturer response on these explanatory factors among the different programme groups would be highly interesting but was considered undesirable given the relatively low number of lecturers.

The lack of interest in the job market by master's programme directors may relates to the fact that the programmes intend to educate graduates that are most suitable to tackle sustainability issues, not graduates that fit best with the current available job descriptions. One could argue that the jobs in which future sustainability professionals can make change towards sustainable development, are still rare because a transformation towards a more sustainable society is not yet taking place. Another type of research, interviewing influential people in the field, also faces this difficulty: these people also work within the system as it is now and refer to their current tasks and necessary skills, not those in the future.

By using sufficient numbers of respondents (> 30), and questions that were tried to be non-ambiguous, attempts were made to get unambiguous results. A drawback of this survey method is, however, that you cannot obtain the actual representation of educational element but are depend for all the input on the way teachers and students *perceive* the representation. From behind the pc at the other end of the globe it is impossible to know whether a respondent fully understands the different teaching concepts on which he/she is filling in the questions. It is not unlikely that students in different parts of the world have a different commitment to studying and different views on what they want to get out of their programme. Let's say students in country X have more respect and expectation of their master's programme than students in country Y for who university fulfills a smaller part of their life. If this was true students in country x, more attached to their programme, possibly fill in a longer list competencies that they want to acquire in the programme and may also have a higher appreciation of which competencies the programme can teach them than the less attached student in Country X. Such issues are likely and that is why the scores given in the different programme groups were not interpreted as the 'truth'. An alternative method would be not asking the respondent directly whether competence or vision is being taught but implicitly by a number of questions from which can obtained which visions and competencies are present.

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APPENDICES

APPENDIX A CHARACTERISTICS STUDENTS RESPONSE

The students that replied to survey are predominantly male (61 % (Table 6-1), mainly between 25 and 34 (56 %) and evenly distributed between the first and second year of the master's programmes (45 % and 44 %). 83 % of the students has professional working experience, mainly in paid job (38 %), in a paid job and an internship (25 %) or in an internship alone (17 %). A majority of 68 % of the students were born in a High Income Country (HIC (196 students)) compared to the 32% (91 students) that were born in Lower or Middle Income Countries (LIC and MIC, World Bank, 2012)). More precisely, 50% of the students were born in what the UN calls the 'Western states' (North-America, EU and Oceania), 25 % in Asia and 17% in Africa and the rest of students in Latin America (5 %) and the Eastern European States (3 %).

83% of the students studies in the same continent as where they were born. It is therefore not surprising that the ratio of the different world regions of the students' country of birth is similar to the ratio of the world regions of the countries of the participating programmes: 57% of the response was from programmes in Western States, 25% from programmes in Asia, 17% from Africa and 1% from Latin and Caribbean states.

Table 6-1: The characterization of the students that replied to the survey (n = 287)

Variables	Frequency	%
GENDER		
Female	159	39
Male	128	61
AGE		
18 to 24	84	29
25 to 34	159	56
35 to 44	28	10
45 to 54	13	4
55 to 64	3	1
NUMBER OF YEARS IN MASTER'S PROGRAMME		
1 ST YEARS	128	45
2 ND YEARS	127	44
3 RD YEARS OR LONGER	30	11
PROFESSIONAL WORKING EXPERIENCE		
Paid job	107	38
Paid and Internship	72	25
Internship	53	18
No experience yet	48	17
Volunteer job	7	2
WORLD REGION COUNTRY OF BIRTH		
Western states (N-America, W-Europe and Australia and New-Z.)	144	50
Asian states	73	25
African states	50	17
Latin and Caribbean states	13	5
Eastern European states	7	3
DEVELOPMENT STATE COUNTRY OF BIRTH		
High income	156	67
Lower or Middle Income	131	33
WORLD REGION COUNTRY OF PROGRAMME		
Western states (N-America, W-Europe and Australia and New-Z.)	163	57
Asian states	72	25
African states	48	17
Latin and Caribbean states	4	1
DEVELOPMENT STATE COUNTRY OF PROGRAMME		
High income Countries	196	68
Lower or Middle Income Countries	91	32
STUDENTS STUDYING OVERSEAS		
Students studying in a different continent than where they were born	48	17%

APPENDIX A1. BSC BACKGROUND OF THE STUDENTS

The disciplinary background of the students in the sustainability master's programmes appears to be highly diverse but some disciplines stand out. The scientific fields that are the best represented are 'Economy, Finance and Business Management' (18 %), 'Environmental Science and Sustainable Development' (18 %) and 'Policy Studies International Relations and Law' (11 %).

Table 0-1: The BSc background of the participating students (n = 287)

Student Background	Absolute amount	Percentage (%)
Agriculture	13	5
Anthropology, Gender Studies, Humanities, Philosophy	13	4
Art, Music	2	1
Ecology, Forestry and Biology	20	7
Economy, Finance and Business Management	53	18
Energy, Chemistry and Physics, Meteorology, Geology	11	4
Engineering	23	8
Environmental Science, Sustainable development	53	18
Geography, Planning, Area studies, Landscape and Architecture	11	4
Languages, Journalism and History	8	3
Liberal Arts/ Multidisciplinary	6	2
Marketing, hospitality Communication, Tourism	10	3
Policy Studies, International Relations and Law	32	11
Psychology, Nursing, Medicine and Social Work, Education	15	5
Sociology	11	4
System Analysis/ Integrative Assessment	6	2
TOTAL	287	100%

APPENDIX A2. STUDENTS' MOTIVATION FOR CHOOSING THEIR MASTER'S PROGRAMME

Students were asked to divide 100 points among 7 different motivations for choosing a master's programme. Two motivations dominate the results 'A strong commitment to solve sustainability issues prevalent in my country' (mean: 30.9/ sd: 20.2) and 'the typical skills and knowledge such a master programme offers' (mean: 26.5/ sd: 17.3). These motivations are followed up by the perspective to get a job (mean: 12.6/ sd: 13.2) and the wish to become a scientific researcher (mean: 7.6/ sd 13.2).

Table 0-2 Students their motivation for choosing their Sustainable Development Master's Programme (n = 287)

Student motivation for choosing Master's programme	Mean score on motivation	Standard Deviation
1. Strong commitment to solve sustainability issues prevalent in country	30.9	20.2
2. Gaining of typical skills and knowledge	26.4	17.3
3. Job perspective	12.6	13.2
4. Wish to become a scientific researcher	7.6	11.1
5. Salary prospects	4.1	7.7
6. Student life in city of programme	2.4	4.8
7. Highly rated status of the university of programme	1.7	4.2
8. Wish to obtain a Master's degree	1.4	3.5
9. Different motivation (1. solving SD issues worldwide and in the developing world, 2. gaining knowledge on sustainability and 3. the interdisciplinarity of the programme)	13.0	21.1
Total	100	100

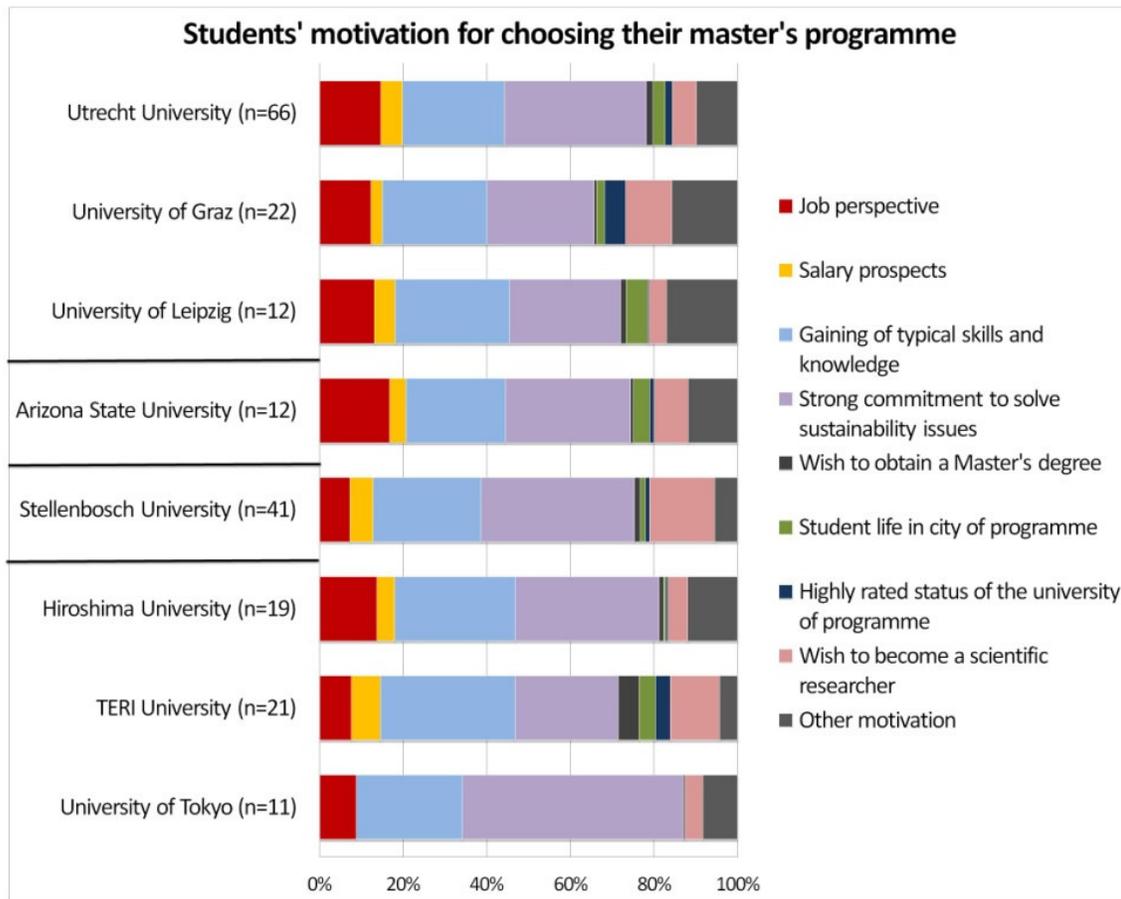
ALTERNATIVE MOTIVATIONS

32% of the respondents also allocated a share of the 100 points they had to divide among the categories to the "different motivation" category (mean: 13/ sd: 21.1). Largely overlapping with the general response, the most important motivation that was filled in here was to solve sustainability issues *worldwide* or in *developing countries* (30 %). Followed up by gaining knowledge on sustainable development (17 %) and the interdisciplinarity of the programme (16 %).

APPENDIX A3: PROGRAMME SPECIFIC MOTIVATIONS

A look at the master's programmes from which more than 10 students responded, reveals a similar pattern (Table 0-2). The strong commitment to solving sustainability issues together with gaining typical skills and knowledge the sustainable development master programmes offer, are the two biggest motivations in all programmes. Notable is the relatively high motivation to become a scientific researcher among student respondents from TERI University and Stellenbosch University in combination with the relatively low score on the "perspective to get a job" motivation. This possibly suggests a relatively low demand for academic sustainability professionals in these two developing nations⁶ compared to the other 6 programmes (situated Europe, North America and Japan). The relatively high motivation of students in these two programmes to become a scientific researcher may have something to do with this too.

Table 0-2: Students' motivation for choosing their master's programme per programme (n = 204)



⁶ South Africa is now regarded a 'High Middle Income Country' and India a 'Lower Middle Income Country' by the World Bank (World Bank, 2012)

APPENDIX B. OVERVIEW LECTURERS RESPONSE

The responding lecturers (n = 54) are predominantly male (61 %, Table 6-1), 39 % of this group is between 35 and 44 years old, 28% between the age of 45 to 54, 20 % in the relatively young age of 25 to 34 and the remainder 13 % is older than 55. Two third (67%) of the participating lecturers was born in a western Half of the lecturers was born in North-America, Western Europe or Oceania, 31 % in Asia and the remainder in Africa (11%) and the Latin America (6 %). Highly similar to where the lecturers were born is the distribution is the distribution of where the lecturers work (World Region Country of Programme: Western states 56 %, Asia 31 %, Africa 9 % and Latin America 4 %).

Table 0-3: The characterization of the lecturers that replied to the survey (n=54)

Variables	Frequency	%
GENDER		
Male	33	61
Female	21	39
AGE		
25 to 34	11	20
35 to 44	21	39
45 to 54	15	28
55 to 64	4	7
65 to 74	3	6
WORLD REGION COUNTRY OF BIRTH		
African states	6	11
Asian states	17	31
Latin and Caribbean states	3	6
Western states (N-America, W-Europe and Australia and New-Z.)	28	52
DEVELOPMENT STATE COUNTRY OF BIRTH		
High income	36	67
Lower or Middle Income	18	33
WORLD REGION COUNTRY OF PROGRAMME		
African states	5	9
Asian states	17	31
Latin and Caribbean states	2	4
Western states (N-America, W-Europe and Australia and New-Z.)	30	56
DEVELOPMENT STATE COUNTRY OF PROGRAMME		
High income	39	72
Lower or Middle Income	15	28

APPENDIX B1: ROLE OF THE LECTURERS AT THEIR UNIVERSITIES

To get an idea of the extent to which the lecturer respondents are familiar enough with their programme to be able to provide a good view on how sustainable development is being taught, the lecturers were asked on the tasks they fulfil in their master's programme.

The participating lecturers appear to be well engaged with their programme since they spend 89% of their work time inside university on average and 35% of their time on education on average (Table 0-4). Moreover, 81% of the lecturers fulfil more than 1 task in their master's programme like lecturing, supervising the thesis project and coordinating the programme: 72 % of the lecturers teaches in compulsory courses, 61 % in optional courses and 59 % supervise students during their thesis project. Roughly half of the lecturers (54%) fulfil a coordinating task.

Table 0-4: Role of lecturers at the university and the programme (n = 54)

TASKS OF LECTURERS AT THEIR UNIVERSITY		
Variables	Mean share of task	Standard Deviation
Time spent on research	35.3	20.6
Time spent on student education	35.1	19.6
Time spent on coordinating role inside the university	18.6	19.2
Time spent on a function outside university	11.0	13.0
POSITION OF LECTURERS IN MASTER'S PROGRAMME		
Number of tasks lecturers fulfill in programme	Frequency	%
1 Task	10	19 %
2 Tasks	18	33 %
3 Tasks	17	31 %
4 Tasks	9	17%
Tasks	Frequency	%
Lecturer of compulsory course(s)	39	72
Lecturer of optional course(s)	33	61
Thesis supervisor	32	59
Coordinating task	29	54

APPENDIX B2: ACADEMIC BACKGROUND OF THE LECTURERS

The academic background of the lecturers is highly diverse, moreover, all but 4 lecturers indicated to have a background in more than 1 discipline. The disciplines that are represented the best are '*Environmental Science*' (mean: 16.1/ sd: 13.08), '*Systems Analysis and Integrative Assessment*' (mean: 10.0/ sd: 8.63), '*Economy and Business Management*' (mean: 12.4/ sd: 14.91) and '*Policy studies and Law*' (mean: 10.5/ sd: 17.64).

Table 0-5: an overview of the different academic backgrounds of lecturers (n=54)

Academic background	Mean score on background	Standard deviation
Chemistry and Physics	3.0	5.16
Communication and Journalism	3.2	5.14
Ecology and Biology	8.2	7.15
Economy and Business Management	12.4	14.91
Engineering	7.0	12.72
Environmental Science	16.1	13.08
Geography	5.8	9.87
Hydrology	3.5	4.17
International Relations	4.9	5.61
Language and Literature	1.4	3.0
Liberal Arts and Humanities	2.1	3.34
Other background (Urban Planning, Oceanography, Health Science, Environmental Governance)	5.3	17.33
Policy studies and Law	10.5	17.64
Psychology	1.1	2.59
Sociology	4.4	5.52
Systems Analysis and Integrative Assessment	10.0	8.63
Toxicology	1.1	2.46

APPENDIX C. LECTURERS QUESTIONNAIRE

A.1 Personal Information

1. What is your gender? *

2. What is your age? *

- 18 to 24
- 25 to 34
- 35 to 44
- 45 to 54
- 55 to 64
- 64 to 74
- 75 or older
- Prefer not to answer

3. What is your country of birth? (Please write down the full name, no abbreviations) *

A.2 Academic background and Teaching responsibilities

4. What is the NAME of the Sustainability Master's Programme you are connected to? (Please write down the full name, no abbreviations) *

5. What is the NAME of the UNIVERSITY of this Sustainability Master's Programme? (Please write down the full name, no abbreviations) *

6. Please indicate YOUR POSITION in your Sustainability Master's Programme by answering 'Yes' or 'No' to the following statements: *

	Yes	No
I have a COORDINATING TASK in this Sustainability Master's Programme	<input type="radio"/>	<input type="radio"/>
I am (one of the) LECTURER(S) of one of the COMPULSORY/ CENTRAL COURSES of this Sustainability Master's Programme	<input type="radio"/>	<input type="radio"/>
I am (one of the) LECTURER(S) of one of the OPTIONAL COURSES of this Sustainability Master's Programme	<input type="radio"/>	<input type="radio"/>
I am (one of the) STUDENT SUPERVISOR(S) during the thesis process of this Sustainability Master's Programme	<input type="radio"/>	<input type="radio"/>

What portion of the hours you work every week do you spend on the following tasks? *

Please indicate what portion the following activities have in the total number of hours you work every week, (including jobs outside the university) by dividing 100 points among the following tasks (Note: fill the fields you want to leave empty with a '0'):

7.

Time spent on student education	<input type="text"/>
Time spent on research	<input type="text"/>
Time spent on a function outside university	<input type="text"/>
Time spent on coordinating role inside the university	<input type="text"/>
Sum	0

8. Please indicate your expertise(s) by dividing 100 points over the following academic disciplines: *
Note: fill the fields you want to leave empty with a '0'. Hint: Use the 'Tab' button of your keyboard to go the next field.

Ecology and Biology	<input type="text"/>
Chemistry and Physics	<input type="text"/>
Hydrology	<input type="text"/>
Engineering	<input type="text"/>
Toxicology	<input type="text"/>
Environmental Science	<input type="text"/>
System Analysis/ Integrative Assessment	<input type="text"/>
International Relations	<input type="text"/>
Policy studies and Law	<input type="text"/>
Economy and Business Management	<input type="text"/>
Sociology	<input type="text"/>
Geography	<input type="text"/>
Marketing and Communication	<input type="text"/>
Psychology	<input type="text"/>
History and Languages	<input type="text"/>
Liberal arts and sciences	<input type="text"/>
Other	<input type="text"/>
Sum	0

If your ~~expertise~~ are not on the list, could you briefly describe these here?

- No/NA (Not applicable to me)
- Yes, namely:

- Intermezzo 1 - Your view on the Concept of Sustainable Development
 On 3 occasions during this survey you will be asked to give your view on a number of statements about the concept of sustainable development.

9. Please give your view on the following set of statements on the concept of Sustainable Development *
Sustainable Development...

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
1... requires a substantial reduction in living standards of the rich and distribution of wealth more fairly in a world that drastically reduces consumption and reduces the size of the global population.	<input type="radio"/>				
2... includes interspecies equity: the importance of biodiversity.	<input type="radio"/>				
3... includes that there is no conflict between the growth of the global market and environmental stability: 'we can have an open vigorous and healthy trading system and achieve sustainable development'.	<input type="radio"/>				
4... is a means to eradicate poverty, meet human needs and ensure that all get a fair share of resources. Social justice today and in the future is a crucial component of the concept of sustainable development.	<input type="radio"/>				
5... requires a transformation of society and/or human relations with the environment to avoid a mounting crisis and even a possible future collapse. Many of the problems are located within the very economic and power structures of society which are not primarily concerned with human well-being or environmental sustainability.	<input type="radio"/>				
6... includes procedural equity: people should be treated openly and fairly.	<input type="radio"/>				

B.1 Your view on Sustainability Issues

Which are the most important NATIONAL sustainability issues in your country in your view? *

10. Please divide 100 points among these 6 issue clusters, according to their importance for the FUTURE OF YOUR COUNTRY (Note: fill the fields you want to leave empty with a '0'):

Population Growth	<input type="text"/>
Ecosystems and Biodiversity	<input type="text"/>
Loss Poverty and Food security	<input type="text"/>
Energy system and climate change	<input type="text"/>
Polluting production and consumption	<input type="text"/>
Sum	0

Which are the most important WORLDWIDE sustainability issues in your view? *

11. Please divide 100 points among these 6 issues, according to their importance for the FUTURE OF OUR PLANET (Note: fill the fields you want to leave empty with a '0'):

Population Growth	<input type="text"/>
Ecosystems and Biodiversity Loss	<input type="text"/>
Poverty and Food security	<input type="text"/>
Energy system and climate change	<input type="text"/>
Polluting production and consumption	<input type="text"/>
Sum	0

12. Is there any sustainability issue missing in above categories which you find important?

- No
- Yes, namely:

B.2 Your view on Sustainable Development Competencies

Learning goals for education programs are often formulated by teaching staff in the form of certain 'competencies' (skills, attitudes and types of knowledge) students should possess after fulfilling their study program.

13. To which extent do you consider the following competencies important for a (future) academic sustainability professional? *

		Importance for a Academic Sustainability Professional				
		Unimportant	Of Little Importance	Moderately Important	Important	Very Important
System thinking and analytical/ integrating capacity	Insight into context and working with <i>system models</i> : Analyzing complex systems across different domains (society, environment, economy) and across different scales (local to global, temporal):	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Leadership- and social skills	Leadership, communicating and convincing: Capable of managing conflicts in socially heterogeneous groups.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Act as a Sustainability Example	Communicate your sustainability values. Live sustainable and show it. Help to change the world around you.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Using media interactively: The ability to bring a message across	The use of language, information, knowledge, social media, and computers to smartly communicate a message to accomplish a <i>broader goal</i> .	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Communicative skills	Language proficiency, debating skills, skills for presenting to specialist and non specialist audiences.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Research and ICT skills	Research skills, statistical knowledge, GIS skills and high familiarity with other applied software.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Self management and acting autonomously	Discipline, sense of responsibility, insight into personal qualities and limitations, setting priorities.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Analyzing, evaluating and crafting Future Scenarios	Being able to think in and work with future scenarios (e.g. climate change scenarios) related to sustainability issues.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Professional knowledge	Knowledge of the natural and/or social science disciplines and relevant policy and legislation; so... that it provides a basis for creativity in developing and/or applying ideas.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Strategic competence and practical skills	The ability to design and implement interventions/transitions toward sustainability. Including the ability to translate theory to practice and 'to get things done': Managing projects in unfamiliar environments with deadlines and inconclusive evidence.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Normative competence	Personal value development and the understanding of the ethics of current and future social systems. The ability to map and apply sustainability values, principles, goals, and targets.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

B.3 Your view on six Teaching Visions

14. **Six visions on the design of Postgraduate Sustainability Education Programmes: ***
How important are in your view the following 6 teaching visions in the teaching of (future) academic sustainability professionals?

	Unimportant	Of Little Importance	Moderately Important	Important	Very Important
A. INTEGRATIVE (BROAD): Educating students in several disciplines, both natural and social science with a focus on cross disciplinary thinking and keeping a holistic view.	<input type="radio"/>				
B. SUB DISCIPLINE (DEEP): Education is focused on mastering a limited number of disciplines: specialization into specific subfields.	<input type="radio"/>				
C. 'Value free' EMPIRICAL (SCIENTIFIC): Focus on the practice of value free, independent scientific research.	<input type="radio"/>				
D. TRANSDISCIPLINARY (LINKING SCIENCE TO PROJECTS IN SOCIETY AND THE MARKET): Focus on generating knowledge in collaboration with parties outside the universities including business, governmental agencies and civilians.	<input type="radio"/>				
E. PERSONAL VALUE DEVELOPMENT (NORMATIVE) Focus on justice, social-ecological integrity and ethics and to personally develop and apply sustainability values and targets.	<input type="radio"/>				

B.4 Your view on your students' job perspectives

What will your students do in 10 years? *

15. *Please indicate in the table below your estimation of the job perspectives of sustainability students, based on the current practice of your sustainability master program, by dividing 100 points over the following possible future jobs (Note: fill the fields you want to leave empty with a '0').*

They will have a job as a consultant	<input type="text"/>
They will have a job at a company working on greening the company/CSR	<input type="text"/>
They will have a job as a policy maker	<input type="text"/>
They will have a job as a scientist	<input type="text"/>
They will have a job at a NGO	<input type="text"/>
They will have a job as a lecturer	<input type="text"/>
They will have started their own companies	<input type="text"/>
They will work outside the sustainability field	<input type="text"/>
Sum	0

Intermezzo 2 - Your view on the concept of Sustainable Development

16. **Please give your view on the following set of statements on the concept of Sustainable Development: ***
Sustainable Development...

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
.. must include in the concept of 'social well-being': not only the well-being of those who are alive today, but also of those who will be here in the future.	<input type="radio"/>				
.. includes that human-made capital cannot replace a multitude of processes vital to human existence such as the ozone layer, photosynthesis or the water cycle. Moreover, non-human species, natural systems and biodiversity have rights and values in themselves.	<input type="radio"/>				
.. includes intergenerational equity: meeting our present needs should not reduce the ability of future generations to meet their needs.	<input type="radio"/>				
.. should recognize the great differences in resource problems that exist between different countries and communities instead of problematizing the sustainability of the global ecosystem. Alternatively, the Third World needs to articulate alternative productive strategies that would entail forms of environmental democracy, economic decentralization, and cultural and political pluralism.	<input type="radio"/>				
.. recognizes that the 'downward spiral of poverty and environmental degradation' calls for a different form of growth, 'changing the quality of growth, meeting essential needs, merging environment and economics in decision making'.	<input type="radio"/>				
.. includes transfrontier responsibility; geographical equity	<input type="radio"/>				

C. Characterizing the current practice in your Sustainability Master's Programme

17. COMPETENCIES: To which extent are the following competencies taught in practice in the Sustainability Master's Programme you are connected to? *

Indicate the amount of teaching time that is spent on the following competencies:

To what extent are these competencies taught in the Master's Programme you are connected to?

		To what extent are these competencies taught in the Master's Programme you are connected to?						
		Not at all			Very Much			
Systems thinking and analytical/ integrating capacity	Insight into context and working with system models: Analyzing complex systems across different domains (society, environment, economy) and across different scales (local to global, temporal):	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Leadership and social skills	Leadership, communicating and convincing: Capable of managing conflicts in socially heterogeneous groups.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Act as a Sustainability Example	Communicate your sustainability values. Live sustainable and show it. Help to change the world around you.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Using media interactively: The ability to bring a message across	The use of language, information, knowledge, social media, and computers to smartly communicate a message to accomplish a broader goal.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Communicative skills	Language proficiency, debating skills, skills for presenting to specialist and non specialist audiences.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Research and ICT skills	Research skills, statistical knowledge, GIS skills and high familiarity with other applied software.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Self management and acting autonomously	Discipline, sense of responsibility, insight into personal qualities and limitations, setting priorities.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Analyzing, evaluating and crafting Future Scenarios	Being able to think in and work with future scenarios (e.g. climate change scenarios) related to sustainability issues.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Professional knowledge	Knowledge of the natural and/or social science disciplines and relevant policy and legislation; so, that it provides a basis for creativity in developing and/or applying ideas.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Strategic competence and practical skills	The ability to design and implement interventions/transitions toward sustainability. Including the ability to translate theory to practice and 'to get things done': Managing projects in unfamiliar environments with deadlines and inconclusive evidence.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Normative competence	Personal value development and the understanding of the ethics of current and future social systems. The ability to map and apply sustainability values, principles, goals, and targets.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

18. EDUCATION VISIONS: To which extent are the six education visions represented in the teaching practice of your Sustainability Master's Programme? (Same six visions as before, B.3 page 6) *
The Sustainability Master's Programme I am connected to has a...

	Not at all							Very Much						
A mainly INTEGRATIVE perspective (Broad).	<input type="radio"/>													
A mainly SUB DISCIPLINE perspective (Deep).	<input type="radio"/>													
A mainly 'Value free' EMPIRICAL perspective (Scientific).	<input type="radio"/>													
A mainly 'TRANSDISCIPLINARY' perspective (Linking Science to projects in society and the market).	<input type="radio"/>													
A mainly 'PERSONAL VALUE DEVELOPMENT' perspective (Normative).	<input type="radio"/>													

19. SUSTAINABILITY ISSUES: From your position as a lecturer, what is your estimation of how much teaching time is averagely spent in your Sustainability Master's Programme on the following clusters of sustainability issues? (Excluding courses on research methods/skills and the master thesis) *

	Never	Sometimes	Regularly	Main activity
Population Growth	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ecosystems and Biodiversity Loss	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Poverty and Food security	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Energy system and climate change	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Inefficient production and consumption	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Urban sprawl and unhealthy megacities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

20. SCIENTIFIC DISCIPLINES: From your position as a lecturer, what is your estimation of what percentage of the total teaching time is averagely spent on the following scientific disciplines in your Sustainability Master's Programme? *
Please indicate how much teaching time is spent on each discipline by allocating 100 points over the disciplines EXCLUDING courses on research methods/skills and the Master Thesis (Note: fill the fields you want to leave empty with a '0', Hint: Use 'Tab' button on keyboard to go to the next field):

Ecology and Biology	<input type="text"/>
Chemistry and Physics	<input type="text"/>
Hydrology	<input type="text"/>
Engineering	<input type="text"/>
Toxicology	<input type="text"/>
Environmental Science	<input type="text"/>
Systems Analysis and Integrative Assessment	<input type="text"/>
International Relations	<input type="text"/>
Communication and Journalism	<input type="text"/>
Liberal Arts and Humanities	<input type="text"/>
Economy and Business Management	<input type="text"/>
Language and Literature	<input type="text"/>
Psychology	<input type="text"/>
Geography	<input type="text"/>
Policy studies and Law	<input type="text"/>
Sociology	<input type="text"/>
A discipline not on this list	<input type="text"/>
Sum	0

If you teach your students a discipline that is not on the list, could you briefly describe it here?
 A. NO/NA (Not applicable to me) B. Yes, namely...

21. TEACHING METHODS: Could you indicate the share that the following teaching methods have in the teaching practice of the Sustainability Master's Program you are connected too? *
Please divide 100 points over the following teaching methods EXCLUDING courses on research methods/skills and the Master Thesis (Note: fill the fields you want to leave empty with a '0'):

Regular lectures about theories in relevant disciplines	<input type="text"/>
(Guest) Lectures	<input type="text"/>
Tutorials (including computer tutorials and simulation games)	<input type="text"/>
Practicals (including field work)	<input type="text"/>
Internships	<input type="text"/>
Advisory projects for external stakeholders	<input type="text"/>
A different method	<input type="text"/>
Sum	0

If your teaching method is not on the list, could you briefly describe it here?

No/NA (Not applicable to me)

Yes, namely:

22. EXPLANATORY FACTORS: To what extent do the following possible factors explain the design and teaching practice of the Sustainability Master's Programme you are connected to? *

	Not at all				Very much			
The available finances for the teaching staff	<input type="radio"/>							
The students' job perspectives	<input type="radio"/>							
Explicit demands from the labor market for specific types of graduates	<input type="radio"/>							
Our view on the dominant local sustainability issues	<input type="radio"/>							
Our view on the dominant global sustainability issues	<input type="radio"/>							
The history of the Master's programme	<input type="radio"/>							
The available expertise of our lecturers	<input type="radio"/>							

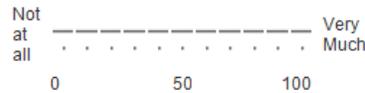
- Intermezzo 3 - Your view on the concept of Sustainable Development

23. **Please give your view on the following (and final) set of statements on the concept of Sustainable Development: ***
Sustainable Development...

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
... includes the view that the mounting crises in the environment and society are interconnected and the social and environmental systems risk breakdown if radical change does not occur.	<input type="radio"/>				
... includes that natural and manufactured capital are in principle interchangeable, with new technology mankind is able to fill human produced gaps in the natural world. In time the world can, in effect, get along without natural resources, so exhaustion is just an event, not a catastrophe'.	<input type="radio"/>				
... requires that there is sufficient money to be made in it for businesses. Partnerships between governments, businesses, environmentalists and scientists could enable technology development.	<input type="radio"/>				
... includes social justice: intragenerational equity: the distribution of resources and justice between present nations or social groups.	<input type="radio"/>				
... requires mainly a more fundamental transformation in underlying values and attitudes to create substantial change.	<input type="radio"/>				

E. Reflection on questionnaire

24. **To which extent do you consider making choices on the issues addressed in this questionnaire relevant for creating a high quality Sustainability Master's Programme? ***
Please click on scale.



25. **What in your view would be needed for academic Sustainability Master's Programmes to really make a difference in accelerating sustainable development globally? ***

APPENDIX D. STUDENTS QUESTIONNAIRE

A.1 Personal Information

1. What is your gender? *

2. What is your age? *

- 18 to 24
- 25 to 34
- 35 to 44
- 45 to 54
- 55 to 64
- 64 to 74
- 75 or older
- Prefer not to answer

3. What is your country of birth? (Please write down the full name, no abbreviations) *

A.2 Academic background

4. What is the NAME of the Sustainability Master's Programme you are connected to? (Please write down the full name, no abbreviations) *

5. What is the NAME of the UNIVERSITY of this Sustainability Master's Programme? (Please write down the full name, no abbreviations) *

6. Please indicate for how long you have been studying in this Sustainable Master's Programme:
I am,

- A FIRST YEAR master student
- A SECOND YEAR master student
- A THIRD YEAR OR LONGER master student

7. What was the most important component of your BsC EDUCATION? *

- Ecology and Biology
- Chemistry and Physics
- Hydrology
- Environmental Science
- Engineering

- Toxicology
- System Analysis/Integrative Assessment
- Languages and History
- Liberal arts
- Economy and Business Management
- Psychology
- Sociology
- Geography
- Policy studies and Law
- International Relations
- Marketing and Communication
- Something different, namely:

8. Do you have any PROFESSIONAL WORKING EXPERIENCE? *

A. Yes in a paid job. B. Yes I did an internship. C. Yes both in a job and an internship
 D. Yes in a volunteer job E. No, not yet

B. Your motivation and career perspective

9. Which of the following motivations was the REASON YOU DECIDED TO ENROL in this Sustainability Master's Programme? *
 Please indicate your motivation for this Master's Programme by dividing 100 points over the following possible 9 motivations (Note: fill the fields you want to leave empty with a '0'):

With this master I am quite sure I will get a job	<input type="text"/>
I want to make a lot of money and there is good money to be made in the sustainability field	<input type="text"/>
I want to acquire the typical skills and knowledge that such a master offers	<input type="text"/>
I feel strongly committed to help solving the sustainability issues prevalent in my country	<input type="text"/>
I want a master's degree and this master is easy to fulfill	<input type="text"/>
I decided for this master because the student life in this city is so good	<input type="text"/>
I want to study at this particular university, in which master is less important	<input type="text"/>
I admire an academic career as a scientific researcher	<input type="text"/>
My motivation is different to those that are named here	<input type="text"/>
Sum	0

Could you briefly describe your motivation for this Sustainability Master's Program if your motivation was NOT ON THE LIST above? A. No/NA (Not applicable to me) B. Yes, namely....

10. In what JOB do you see yourself working in TEN YEARS? *
Please divide 100 points (Note: fill the fields you want to leave empty with a '0'): Ten years after my study I hope to...

Have a job as a consultant	<input type="text"/>
Have a job at a company working on greening the company/ CSR	<input type="text"/>
Have a job as a policy maker	<input type="text"/>
Have a job as a scientist	<input type="text"/>
Have a job at a NGO	<input type="text"/>
Have a job as a lecturer	<input type="text"/>
Have started my own company	<input type="text"/>
Work outside the sustainability field	<input type="text"/>
Sum	0

- Intermezzo 1 - Your View on Sustainable Development

On three occasions during this survey you will be asked to give your view on a number of statements about sustainable development.

11. Please give your view on the following set of statements on Sustainable Development: *
Sustainable Development...

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
.. requires a substantial reduction in living standards of the rich and distribution of wealth more fairly in a world that drastically reduces consumption and reduces the size of the global population.	<input type="radio"/>				
.. includes interspecies equity: importance of biodiversity.	<input type="radio"/>				
.. includes no conflict between the growth of the global market and environmental stability: 'we can have an open vigorous and healthy trading system and achieve sustainable development'.	<input type="radio"/>				
.. is a means to eradicate poverty, meet human needs and ensure that all get a fair share of resources. Social justice today and in the future is a crucial component of the concept of sustainable development.	<input type="radio"/>				
.. requires a transformation of society and/or human relations with the environment to avoid a mounting crisis and even a possible future collapse. Many of the problems are located within the very economic and power structures of society which are not primarily concerned with human well-being or environmental sustainability.	<input type="radio"/>				
.. includes procedural equity: people should be treated openly and fairly.	<input type="radio"/>				

C. Your view on Sustainability Issues

12. Which are the most important NATIONAL sustainability issues in your country in your view? *

Please divide 100 points among these 6 issue clusters, according to their importance for the FUTURE OF YOUR COUNTRY (Note: fill the fields you want to leave empty with a '0').

Population Growth	<input type="text"/>
Ecosystems and Biodiversity	<input type="text"/>
Poverty and Food security	<input type="text"/>
Energy system and climate change	<input type="text"/>
Polluting production and consumption	<input type="text"/>
Sum	0

13. Which are the most important WORLDWIDE sustainability issues in your view? *

Please divide 100 points among these 6 issues, according to their importance for the FUTURE OF OUR PLANET (Note: fill the fields you want to leave empty with a '0').

Population Growth	<input type="text"/>
Ecosystems and Biodiversity Loss	<input type="text"/>
Poverty and Food security	<input type="text"/>
Energy system and climate change	<input type="text"/>
Polluting production and consumption	<input type="text"/>
Sum	0

14. Is there any sustainability issue MISSING in above categories which you find important?

- No
- Yes, namely:

D.1 Education: What do you get educated and what would you ideally like to learn?

Learning goals for teaching programs are often formulated by teaching staff in the form of certain 'competencies' (skills, attitudes and types of knowledge) students should possess after fulfilling their study program. The next 2 questions will focus on such competencies.

15. To which extent are the following competencies taught in your Sustainability Master's Programme? *

Indicate the amount of teaching time you receive on the following competencies:

		To what extent are these competencies taught in your Sustainability Master's programme?						
		Not at all		Very Much				
		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Systems thinking and analytical/ integrating capacity	Insight into context and working with <i>system models</i> : Analyzing complex systems across different <i>domains</i> (society, environment, economy) and across different <i>scales</i> (local to global, temporal).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Leadership- and social skills	Leadership, communicating and convincing: Capable of managing conflicts in socially heterogeneous groups.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Act as a Sustainability Example	Communicate your sustainability values. Live sustainable and show it. Help to change the world around you.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Using media interactively: The ability to bring a message across	The use of language, information, knowledge, social media, and computers to smartly communicate a message to accomplish a <i>broader goal</i> .	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Communicative skills	Language proficiency, debating skills, skills for presenting to specialist and non specialist audiences.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Research and ICT skills	Research skills, statistical knowledge, GIS skills and high familiarity with other applied software.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Self management and acting autonomously	Discipline, sense of responsibility, insight into personal qualities and limitations, setting priorities.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Analyzing, evaluating and crafting Future Scenarios	Being able to think in and work with future scenarios (e.g. climate change scenarios) related to sustainability issues.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Professional knowledge	Knowledge of the natural and/or social science disciplines and relevant policy and legislation; so, that it provides a basis for creativity in developing and/or applying ideas.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Strategic competence and practical skills	The ability to design and implement interventions/transitions toward sustainability. Including the ability to translate theory to practice and 'to get things done': Managing projects in unfamiliar environments with deadlines and inconclusive evidence.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Normative competence	Personal value development and the understanding of the ethics of current and future social systems. The ability to map and apply sustainability values, principles, goals, and targets.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

16.

Self management and acting autonomously	Discipline, sense of responsibility, insight into personal qualities and limitations, setting priorities.	<input type="checkbox"/>				
Analyzing, evaluating and crafting Future Scenarios	Being able to think in and work with future scenarios (e.g. climate change scenarios) related to sustainability issues.	<input type="checkbox"/>				
Professional knowledge	Knowledge of the natural and/or social science disciplines and relevant policy and legislation; so, that it provides a basis for creativity in developing and/or applying ideas.	<input type="checkbox"/>				
Strategic competence and practical skills	The ability to design and implement interventions/transitions toward sustainability. Including the ability to translate theory to practice and 'to get things done': Managing projects in unfamiliar environments with deadlines and inconclusive evidence.	<input type="checkbox"/>				
Normative competence	Personal value development and the understanding of the ethics of current and future social systems. The ability to map and apply sustainability values, principles, goals, and targets.	<input type="checkbox"/>				
Using media interactively: The ability to bring a message across	The use of language, information, knowledge, social media, and computers to smartly communicate a message to accomplish a <i>broader goal</i> .	<input type="checkbox"/>				
Communicative skills	Language proficiency, debating skills, skills for presenting to specialist and non specialist audiences.	<input type="checkbox"/>				
Research and ICT skills	Research skills, statistical knowledge, GIS skills and high familiarity with other applied software.	<input type="checkbox"/>				

- Intermezzo 2 - Your View on Sustainable Development

17. Please give your view on the following set of statements on Sustainable Development: *
Sustainable Development...

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
... includes in the concept of 'social well-being': not only the well-being of those who are alive today, but also of those who will be here in the future.	<input type="radio"/>				
... includes that human-made capital cannot replace a multitude of processes vital to human existence such as the ozone layer, photosynthesis or the water cycle. Moreover, non-human species, natural systems and biodiversity have rights and values in themselves.	<input type="radio"/>				
... includes intergenerational equity: meeting our present needs should not reduce the ability of future generations to meet their needs.	<input type="radio"/>				
... should recognize the great differences in resource problems that exist between different countries and communities instead of problematizing the sustainability of the global ecosystem as a whole. Alternatively, the Third World needs to articulate alternative productive strategies that would entail forms of environmental democracy, economic decentralization, and cultural and political pluralism.	<input type="radio"/>				
... recognizes that the 'downward spiral of poverty and environmental degradation' calls for a different form of growth, 'changing the quality of growth, meeting essential needs, merging environment and economics in decision making'	<input type="radio"/>				
... includes transfrontier responsibility; geographical equity	<input type="radio"/>				

D.2 Education visions: Your current and your ideal Sustainability Master's Programme

Different visions exist on the design of sustainability education programs. Six visions can be recognized. A summary:

Integrative perspective (Broad) Educating students in several disciplines, both natural and social science with a focus on cross disciplinary thinking and keeping a holistic view.
Sub discipline perspective (Deep) Education is focused on mastering a limited number of disciplines: Specialization into specific subfields.
'Value-free' Empirical perspective (Scientific) Focus on the practice of value free, independent scientific research.
Transdisciplinary perspective (Linking science to projects in society and the market). Focus on generating knowledge in collaboration with parties outside the universities including business, governmental agencies and civilians).
Personal value development perspective (Normative) Focus on understanding justice, equity, social-ecological integrity, and ethics and to personally develop and apply sustainability values and targets.

18. What does your current Sustainability Master's Programme in reality look like in terms of above education visions? *

My Sustainability Master's Programme has a...

	Not at all			Very Much		
A mainly INTEGRATIVE perspective (Broad)	<input type="radio"/>					
A mainly SUB DISCIPLINE perspective (Deep)	<input type="radio"/>					
A mainly 'Value free' EMPIRICAL perspective (Scientific)	<input type="radio"/>					
A mainly TRANS DISCIPLINARY perspective (Linking science to projects in society and the market)	<input type="radio"/>					
A mainly 'PERSONAL VALUE DEVELOPMENT' perspective (Normative)	<input type="radio"/>					

19. What does your IDEAL Sustainability Master's Programme looks like in terms of above education visions? **
My IDEAL Sustainability Master's Programme has a...

	Not at all			Very Much		
A mainly INTEGRATIVE perspective (Broad)	<input type="radio"/>					
A mainly SUB DISCIPLINE perspective (Deep)	<input type="radio"/>					
A mainly 'Value free' EMPIRICAL perspective (Scientific)	<input type="radio"/>					
A mainly TRANS DISCIPLINARY perspective (Linking science to projects in society and the market)	<input type="radio"/>					
A mainly 'PERSONAL VALUE DEVELOPMENT' perspective (Normative)	<input type="radio"/>					

D.3 Content: Focus on Sustainability Issues

20. How much time is spent in your Sustainability Master's Programme on the following sustainability issues? *

	Never	Sometimes	Regularly	Main activity
Population Growth	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ecosystems and Biodiversity Loss	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Poverty and Food security	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Energy system and climate change	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Inefficient production and consumption	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Urban sprawl and unhealthy megacities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

21. How much time would you IDEALLY spend in your IDEAL Sustainability Master's Programme on the following sustainability issues? *

	Never	Sometimes	Regularly	Main activity
Population Growth	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ecosystems and Biodiversity Loss	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Poverty and Food security	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Energy system and climate change	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Inefficient production and consumption	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Urban sprawl and unhealthy megacities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

22. Could you indicate the share (percentage) that the following teaching methods have in the teaching practice of your Sustainability Master's Program? *

Please divide 100 points over the following teaching methods, EXCLUDING THESIS (Note: fill the fields you want to leave empty with a 0):

Regular lectures about theories in relevant disciplines	<input type="text"/>
Guest lectures	<input type="text"/>
Tutorials (including computer tutorials and simulation games)	<input type="text"/>
Practicals (including field work)	<input type="text"/>
Internships	<input type="text"/>
Advisory projects for external stakeholders	<input type="text"/>
A teaching method not on this list	<input type="text"/>
Sum	<input type="text" value="0"/>

If there is a teaching method used in your Master's Programme that is not on the list, could you briefly describe it here?

A. No/NA (Not applicable to me) B. Yes, namely....

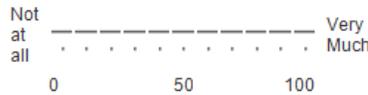
- Intermezzo 3 - Your View on Sustainable Development

23. **Please give your view on the following (and final) set of statements on Sustainable Development: ***
The Concept of Sustainable Development,

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
.. includes the view that the mounting crises in the environment and society are interconnected and the social and environmental systems risk breakdown if radical change does not occur.	<input type="radio"/>				
.. includes that natural and manufactured capital are in principle interchangeable, with new technology mankind is able to fill human produced gaps in the natural world. In time the world can, in effect, get along without natural resources, so exhaustion is just an event.	<input type="radio"/>				
.. requires that there is sufficient money to be made in it for businesses. Partnerships between governments, businesses, environmentalists and scientists could enable technology development.	<input type="radio"/>				
.. includes social justice: intragenerational equity: the distribution of resources and justice between present nations or social groups.	<input type="radio"/>				
.. requires mainly a more fundamental transformation in underlying values and attitudes to create substantial change.	<input type="radio"/>				

E. Reflection on questionnaire

24. **To which extent do you consider making choices on the issues addressed in this questionnaire relevant for creating a high quality Sustainability Master's Programme? ***
Please click on scale.



25. **What in your view would be needed for academic Sustainability Master's programmes to really make a difference in accelerating sustainable development globally? ***

26. **To what extent is the following statement applicable to you: ***
"For me personally I am very much interested and involved in trying to get the teaching in my Sustainability Master's Programme as good as possible"

- Strongly Agree
- Agree
- Undecided
- Disagree
- Strongly Disagree

Amazon.com Gift Card Give away

27. **Would you like to participate in the give away of 10 Amazon.com gift cards to 10 lucky survey participants? ***
If you like you can fill in your email address below, it will not be used for other purposes and will be deleted after the give away.